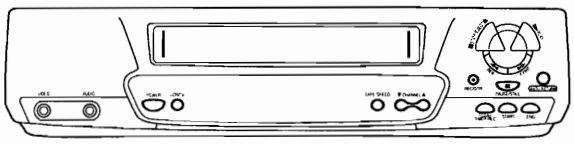
Symphonic SYLVANIA

SERVICE MANUAL

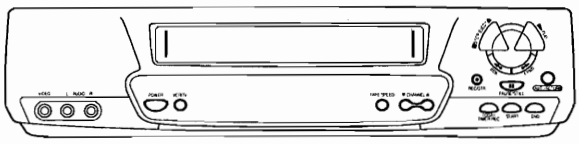
Sec. 1: Main Section	Sec. 2: Deck Mechanism Section	Sec. 3: Exploded views and Parts List Section
● Specifications ● Preparation for Servicing ● Adjustment Procedures ● Schematic Diagrams ● CBA's	● Standard Maintenance ● Alignment for Mechanism ● Disassembly/Assembly of Mechanism ● Front Loading Assembly ● Alignment Procedures of Mechanism	● Exploded views ● Parts List

VIDEO CASSETTE RECORDER

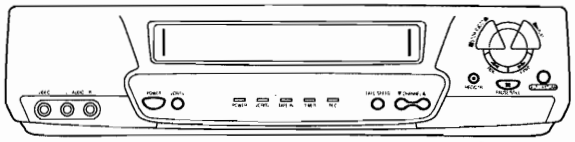
2945LF
(4 head mono)



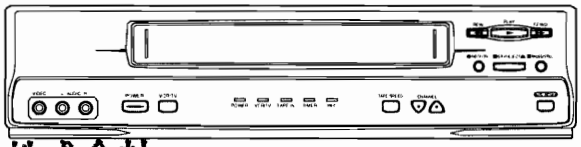
2965LF/2970LV
(4 head Hi-Fi)



2965LV
(4 head Hi-Fi)



VR-69WF
(4 head Hi-Fi)



船井サービス株式会社
マニュアル課

VHS

IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all Funai Equipment. The service procedures recommended by Funai and described in this service manual are effective methods of performing service operations. Some of these service special tools should be used when and as recommended.

It is important to note that this service manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Funai could not possibly know, evaluate and advice the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Funai has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Funai must first use all precautions thoroughly so that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

MAIN SECTION

VIDEO CASSETTE RECORDER

2945LF/2965LF/2970LV/ 2965LV/VR-69WF

Sec. 1: Main Section

- **Specifications**
- **Preparation for Servicing**
- **Adjustment Procedures**
- **Schematic Diagrams**
- **CBA' s**

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SPECIFICATIONS

Description	Unit	Minimum	Nominal	Maximum	Condition
1. Video					
1-1 Video Output (PB)	Vp-p	0.8	1.0	1.2	FL8A
1-2 Video Output (R/P)	Vp-p	0.8	1.0	1.2	
1-3 Video S/N Y (R/P)	dB	41	44		SP Mode
1-4 Video Color S/N AM (R/P)	dB	35	44		SP Mode
1-5 Video Color S/N PM (R/P)	dB	33	37		SP Mode
1-6 Resolution (PB)	Line	210	230		FL8M
2. Servo					
2-1 Jitter Low (R/P)	μsec		0.05	0.1	SP Mode
2-2 Wow & Flutter (R/P) (NORMAL AUDIO)	%		0.2	0.4	SP Mode
3. Normal Audio					
3-1 Output (PB)	dBV	-10	-6	-2	FL8A
3-2 Output (R/P)	dBV	-10	-6	-2	SP Mode
3-3 S/N	dB	38	43		SP Mode
3-4 Distortion	%		2	4.0	SP Mode
3-5 Freq. resp (R/P) at 200Hz	dB	-6	0		SP Mode
(-20dB ref. 1kHz) at 8kHz	dB	-6	-1.5		SP Mode
4. Tuner (10 ch)					
4-1 Video Output (Color Bar signal with 100% White)	Vp-p	0.8	1.0	1.2	E-E Mode
4-2 Video S/N (S/N Y signal)	dB	40	47		E-E Mode
4-3 Audio Output (1kHz)	dBV	-10	-6	-4	E-E Mode
4-4 Audio S/N (1kHz)	dB	40	46		E-E Mode
5. Hi-Fi Audio (2965LF/2970LV/2965LV/VR-69WF Model only)					
5-1 Output	dBV	-11	-8	-5	FL8HA
5-2 Output	dBV	-11	-8	-5	SP
5-3 Dynamic Range	dB	80	90		SP
5-4 Freq. resp (6dB B.W)	Hz		20~20k		SP

Note: Nominal specs represent the design specs. All units should be able to approximate these – some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition that still might be considered acceptable; In no case should a unit fail to meet limit specs.

IMPORTANT SAFETY PRECAUTIONS

Product Safety Notice

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by a ⚠ on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are carefully inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Precautions during Servicing

A. Parts identified by the ⚠ symbol are critical for safety. Replace only with part number specified.

B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.

Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

C. Use specified internal wiring. Note especially:

1) Wires covered with PVC tubing
2) Double insulated wires
3) High voltage leads

D. Use specified insulating materials for hazardous live parts. Note especially:

1) Insulation tape
2) PVC tubing
3) Spacers
4) Insulators for transistors

E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).

G. Check that replaced wires do not contact sharp edges or pointed parts.

H. When a power cord has been replaced, check that 5 - 6 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

K. Crimp type wire connector

The power transformer uses crimp type connectors which connect the power cord and the primary side of the transformer. When replacing the transformer, follow these steps carefully and precisely to prevent shock hazards.

Replacement procedure

1) Remove the old connector by cutting the wires at a point close to the connector.

Important: Do not re-use a connector. (Discard it.)

2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

4) Use a crimping tool to crimp the metal sleeve at its center. Be sure to crimp fully to the complete closure of the tool.

L. When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC outlet.

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts, and wires have been returned to their original positions. Afterwards, do the following tests and confirm the specified values to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1 : Ratings for selected area

AC Line Voltage	Clearance Distance (d) (d')
120 V	≥ 3.2 mm (0.126 inches)

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

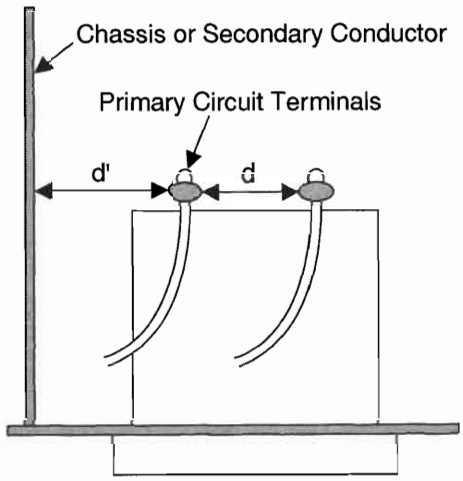


Fig. 1

2. Leakage Current Test

Confirm the specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

Measuring Method (Power ON) :

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across the terminals of load Z. See Fig. 2 and the following table.

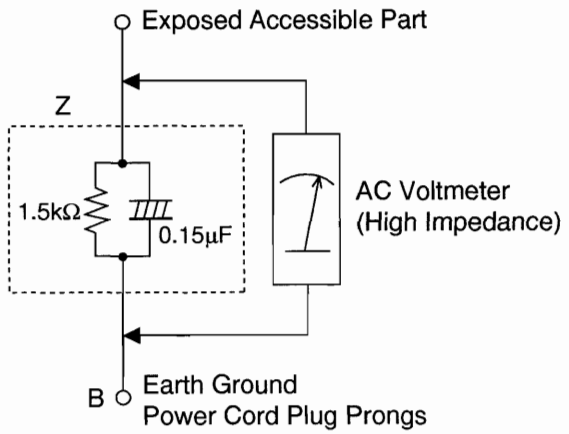


Fig. 2

Table 2 : Leakage current ratings for selected areas

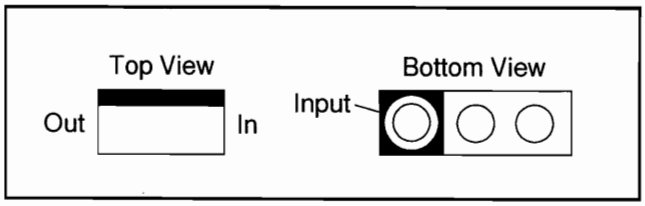
AC Line Voltage	Load Z	Leakage Current (i)	Earth Ground (B) to:
120 V	0.15μF CAP. & 1.5kΩ RES. Connected in parallel	i ≤ 0.5mA Peak	Exposed accessible parts

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

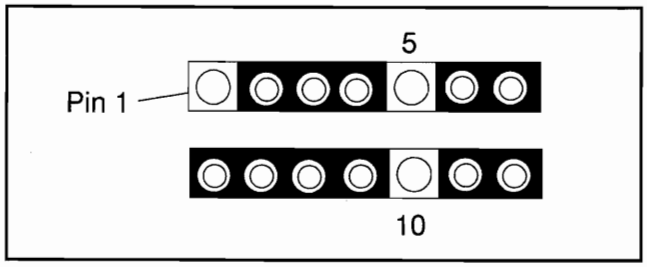
STANDARD NOTES FOR SERVICING

Circuit Board Indications

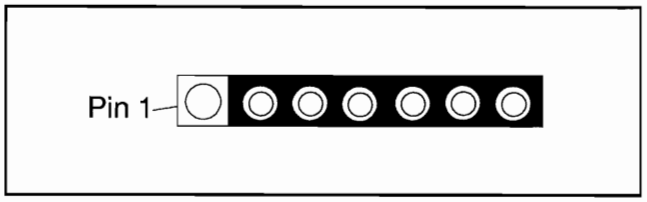
a. The output pin of the 3 pin Regulator ICs is indicated as shown.



b. For other ICs, pin 1 and every fifth pin are indicated as shown.

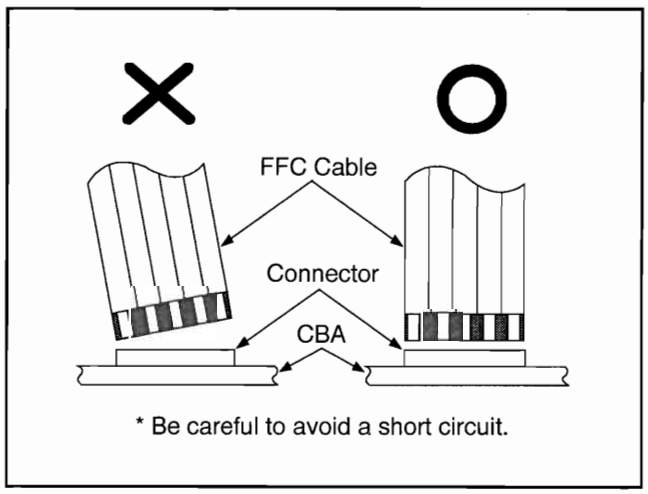


c. The 1st pin of every male connector is indicated as shown.



Instructions for Connectors

1. When you connect or disconnect the FFC (Flexible Foil Connector) cable, be sure to first disconnect the AC cord.
2. FFC (Flexible Foil Connector) cable should be inserted parallel into the connector, not at an angle.



How to Remove / Install Flat Pack-IC

1. Removal

With Hot-Air Flat Pack-IC Desoldering Machine:

(1) Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. S-1-1)

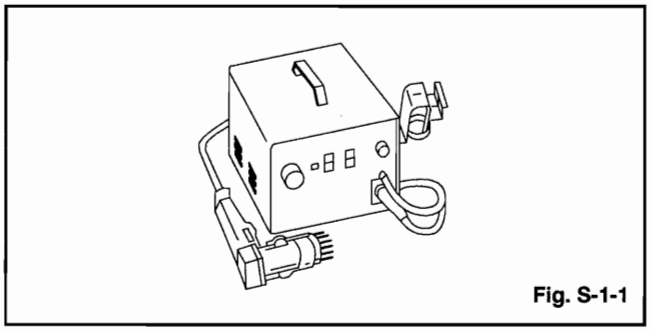


Fig. S-1-1

(2) Remove the flat pack-IC with tweezers while applying the hot air.

(3) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(4) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

Caution:

1. Do not supply hot air to the chip parts around the flat pack-IC for over 6 seconds because damage to the chip parts may occur. Put masking tape around the flat pack-IC to protect other parts from damage. (Fig. S-1-2)
2. The flat pack-IC on the CBA is affixed with glue, so be careful not to break or damage the foil of each pin or the solder lands under the IC when removing it.

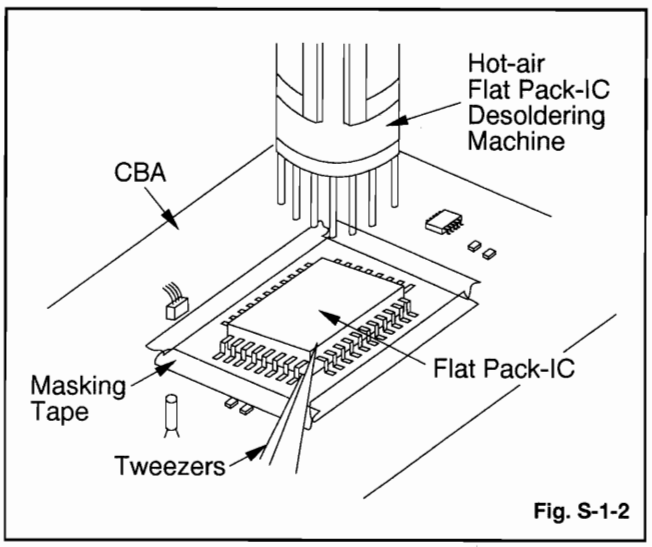


Fig. S-1-2

With Soldering Iron:

(1) Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)

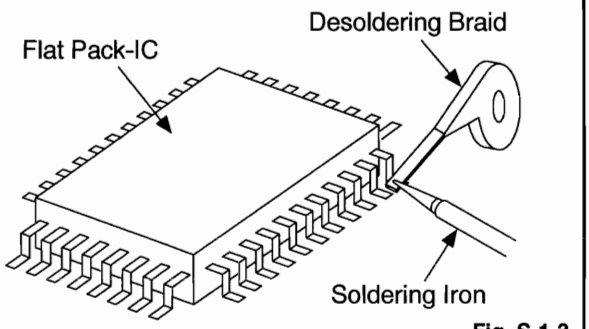


Fig. S-1-3

(2) Lift each lead of the flat pack-IC upward one by one, using a sharp pin or wire to which solder will not adhere (iron wire). When heating the pins, use a fine tip soldering iron or a hot air desoldering machine. (Fig. S-1-4)

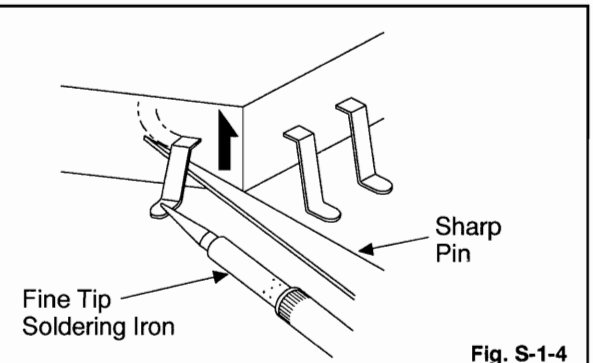


Fig. S-1-4

(3) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(4) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

With Iron Wire:

(1) Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)

(2) Affix the wire to a workbench or solid mounting point, as shown in Fig. S-1-5.

(3) While heating the pins using a fine tip soldering iron or hot air blower, pull up the wire as the solder melts so as to lift the IC leads from the CBA contact pads as shown in Fig. S-1-5.

(4) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(5) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

Note:

When using a soldering iron, care must be taken to ensure that the flat pack-IC is not being held by glue. When the flat pack-IC is removed from the CBA, handle it gently because it may be damaged if force is applied.

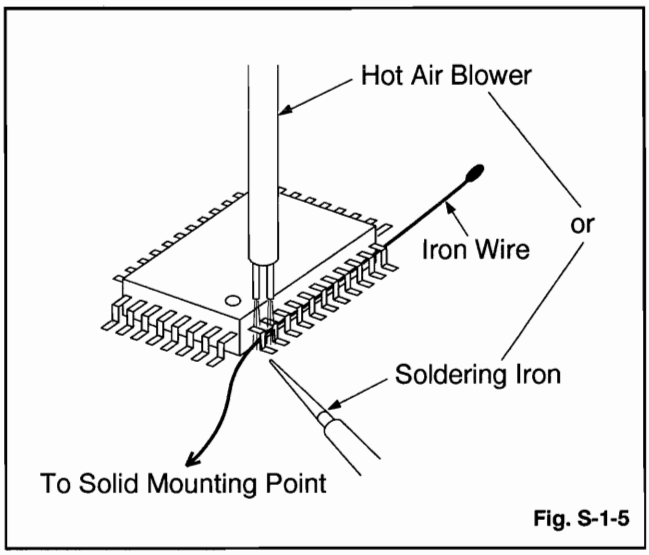


Fig. S-1-5

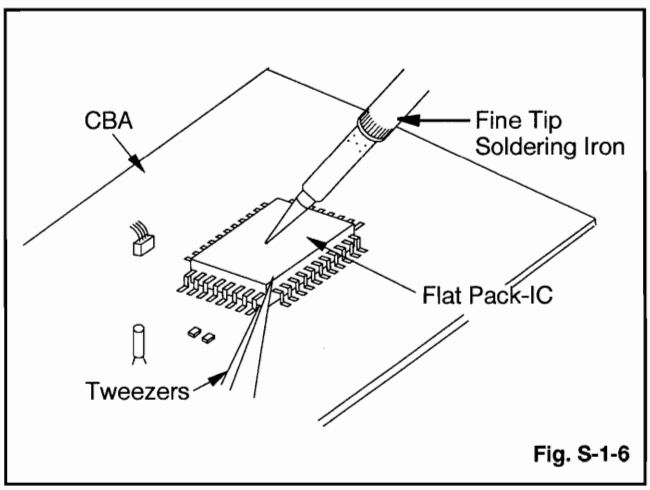


Fig. S-1-6

2. Installation

(1) Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the CBA so you can install a replacement flat pack-IC more easily.

(2) The " ● " mark on the flat pack-IC indicates pin 1. (See Fig. S-1-7.) Be sure this mark matches the 1 on the PCB when positioning for installation. Then pre- solder the four corners of the flat pack-IC. (See Fig. S-1-8.)

(3) Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.

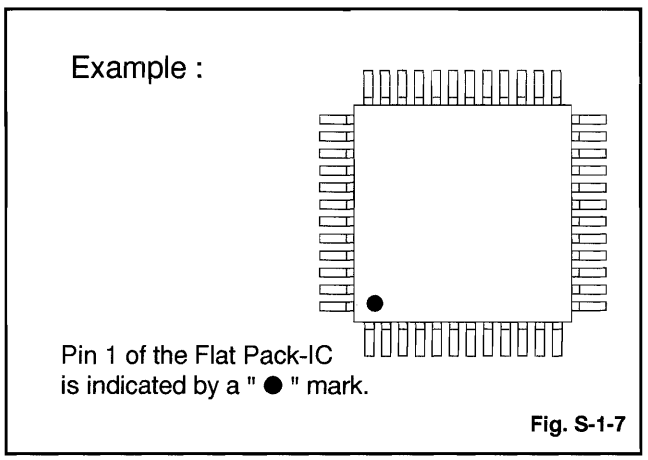


Fig. S-1-7

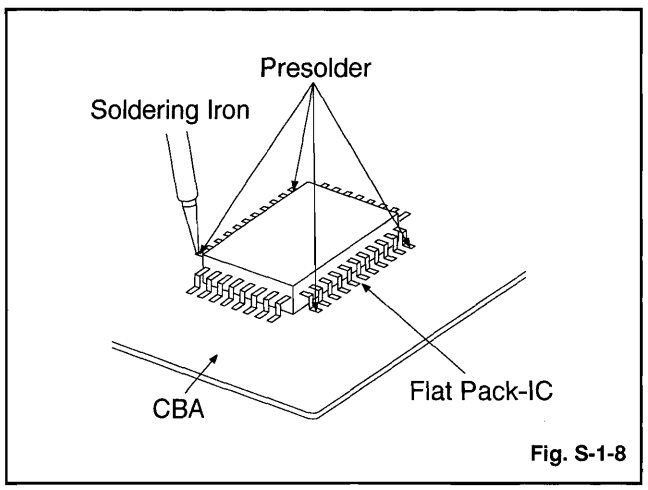


Fig. S-1-8

Instructions for Handling Semiconductors

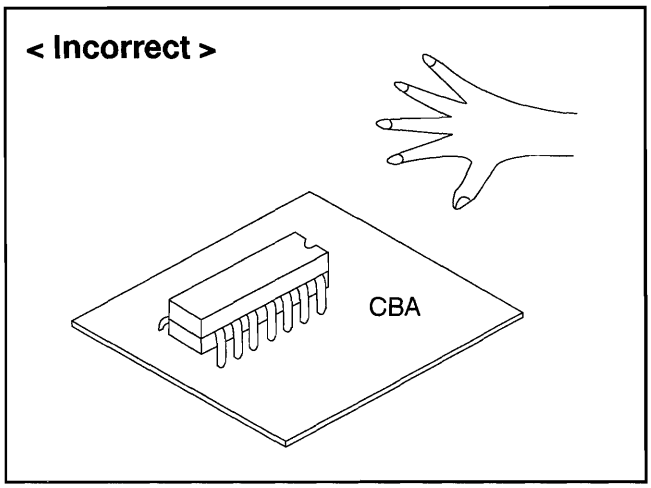
Electrostatic breakdown of the semiconductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

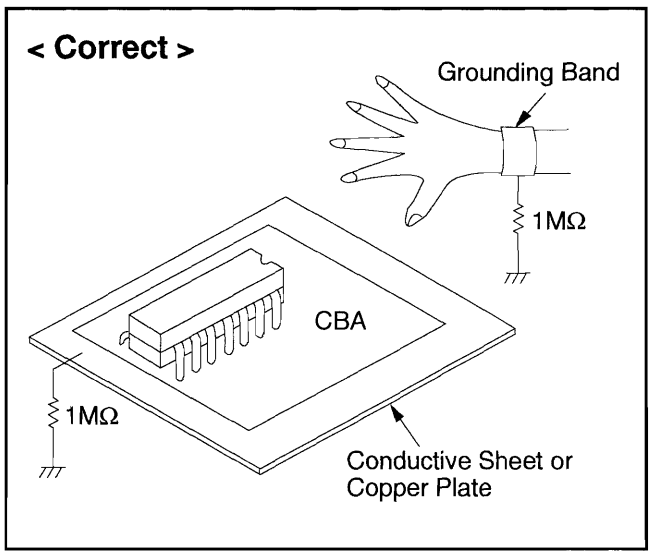
1. Ground for Human Body

Be sure to wear a grounding band (1MΩ) that is properly grounded to remove any static electricity that may be charged on the body.

2. Ground for Workbench

Be sure to place a conductive sheet or copper plate with proper grounding (1MΩ) on the workbench or other surface, where the semiconductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semiconductors with your clothing.





PREPARATION FOR SERVICING

How to Use U19 Deck Extension Cable

(1) Remove the Deck Mechanism Assembly. If needed, remove the Main CBA from the chassis. Refer to "Cabinet Disassembly Instructions" on page 1-6-1.

(2) Connect Main CBA and Deck with the U19 Deck Extension Cable (A) as shown in Fig. 1. And connect Main CBA and Deck with U19 Deck Extension Cable (B) as shown in Fig. 1. Connect 2 Clips on U19 Deck Extension Cable (B) to Shield on Main CBA.
(U19 Deck Extension Cable: N1200XA)

Note 1: There are 3 types of U19 Deck Extension Cable (A). They are for 2 Head, 4 Head, and Hi-Fi. Use a connector indicated as shown. Be careful not to let the unused connector contact other parts.

Note 2: Some noise will be present in the playback picture when the extension cable is used.

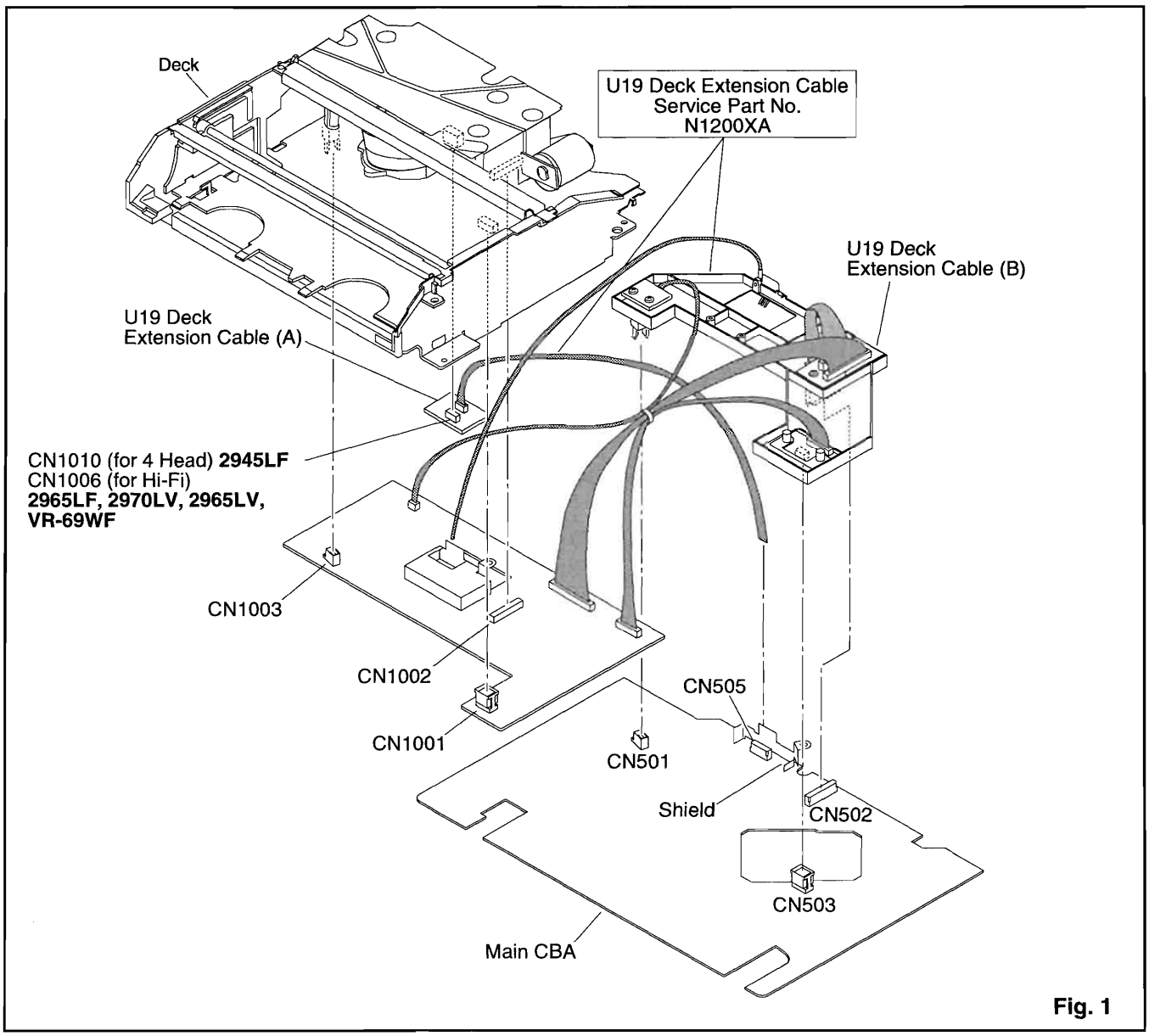


Fig. 1

How to Enter the Service Mode

Caution:

An optical sensor system is used for the Tape Start and End Sensors on this equipment. Carefully read and follow the instructions below. Otherwise the unit may operate erratically.

What to do for preparation

Insert a tape into the Deck Mechanism Assembly and press the PLAY button. The tape will be loaded into the Deck Mechanism Assembly. Make sure the power is on, connect TP502 (SENSOR INHIBITION) to TP501 (GROUND). This will stop the function of Tape Start Sensor, Tape End Sensor and Reel Sensors. (If these TPs are connected before plugging in the unit, the function of the sensors will stay valid.) See Fig. 2.

Note: Because the Tape End Sensors are inactive, do not run a tape all the way to the start or the end of the tape to avoid tape damage.

About REC-Safety Switch

Caution:

The REC-Safety Switch is directly mounted on the Main CBA. When the Deck Mechanism Assembly is removed from the Main CBA for servicing, this switch does not work automatically.

What to do for preparation

In order to record, press the Rec button while pushing REC-SAFETY SW on the Main CBA. See Fig. 2.

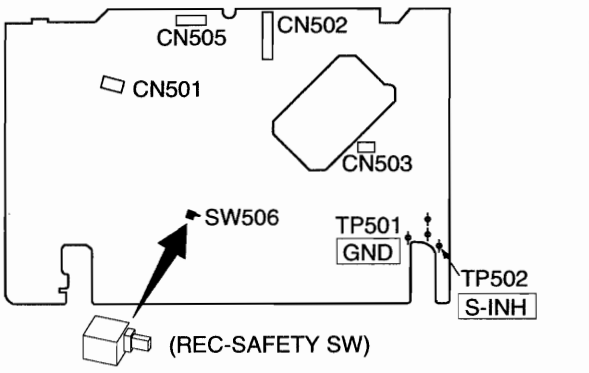


Fig. 2

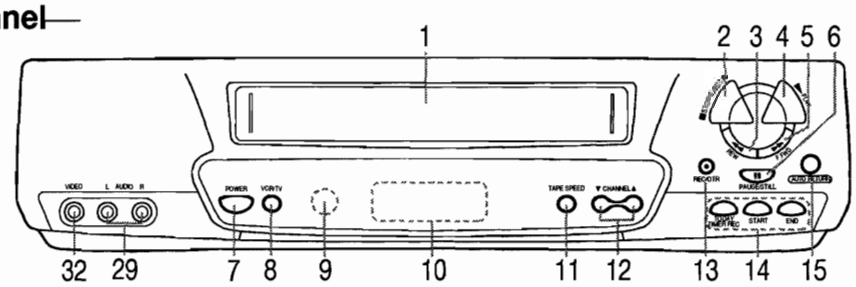
OPERATING CONTROLS AND FUNCTIONS

Models: 2945LF/2965LF

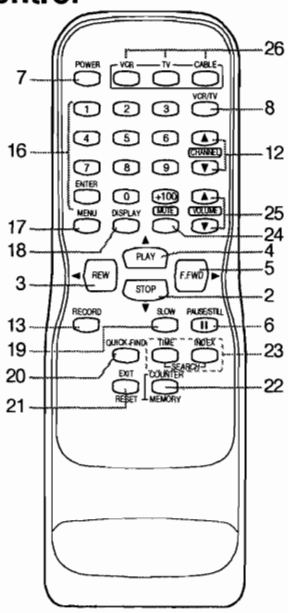
Note:

We do not recommend the use of universal remote controls. Not all of the functions may be controlled with a universal remote control. If you decide to use a universal remote control with this unit, please be aware that the code number given may not operate this unit. In this case, please call the manufacturer of the universal remote control.

—VCR Front Panel—



—Remote Control—



Part No. : N9393UD

1. **Cassette Compartment**
2. **EJECT button–** Press to remove the tape from the VCR. (only on the VCR)

   STOP button– Press to stop the tape motion.

   ▼ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)
3. **REW button–** Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

   ◄ button– Press to cancel a setting of timer program. Press to correct digits when setting program (For example: setting clock or timer program). Press to add or delete channel numbers during channel preset. (only on the remote control)
4. **PLAY button–** Press to begin playback.

   ▲ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)
5. **F.FWD button–** Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

   ► button– When setting program (For example: setting clock or timer program), press to determine your selection and proceed to the next step you want to input. Press to determine the setting modes from the on screen menu. Press to add or delete channel numbers during channel preset. (only on the remote control)
6. **PAUSE/STILL button–** Press to temporarily stop the tape during recording or to view a still picture during playback.

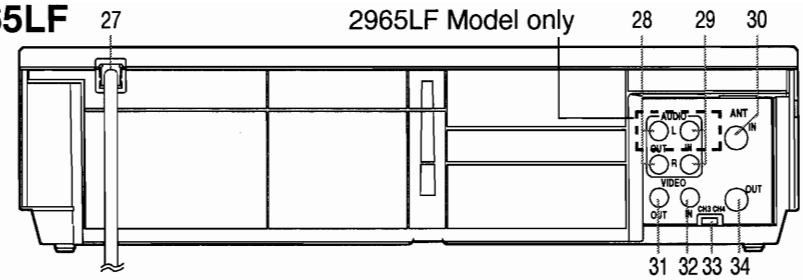
   Frame Advance function– Press to advance the picture by one frame at a time during still mode.
7. **POWER button–** Press to turn VCR on and off. Press to activate timer recording.
8. **VCR/TV button–** Press to select TV or VCR mode.

   VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

   TV position: to watch TV or to view one program while recording another.
9. **Remote sensor window–** Receives the infrared signals from the remote control.
10. **Digital display**
11. **TAPE SPEED button–** Press to choose the desired recording speed : SP/SLP. (only on the VCR)
12. **CHANNEL ▲ or ▼ buttons–** Press to select the desired channels for viewing or recording.

Models: 2945LF/2965LF

—Rear View—



Tracking function– Press to minimize video 'noise' (lines or dots on screen) during playback or slow mode.

Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.

13. **RECORD button–** Press for manual recording.

    OTR button– Press to activate One Touch Recording. (only on the VCR)

14. **TODAY TIMER REC button–** Press to set a today timer program, or to check it. (only on the VCR)

    START button– Press to enter desired start time during today timer setting. (only on the VCR)

    END button– Press to enter desired end time during today timer setting. (only on the VCR)

15. **AUTO RETURN button–** Rewinds to the beginning of the timer recording.

16. **NUMBER buttons–** Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9. (only on the remote control)

    +100 button– When selecting cable channels which are higher than 99, press this button first, then press the last two digits. (To select channel 125, first press "+100" button then press "2" and "5"). (only on the remote control)

    ENTER button– Press to memorize the number corresponding to the brand of your TV as shown in the owner's manual. For example, If you have an RCA TV, press 0, then 8 button. then, press the ENTER button.(only on the remote control)

17. **MENU button–** Press to display the menu on the TV screen. Press to exit the menu on the TV screen. (only on the remote control)

18. **DISPLAY button–** Press to display the counter or the current channel number and the current time on the TV screen. (only on the remote control)

19. **SLOW button–** Press to start slow motion playback. The slow speed can be controlled by pressing the F.FWD button (faster) or REW button (slower). (only on the remote control)

20. **QUICK-FIND button–** Press the MENU button until the SERCH SELECT menu appears and select Quick Find. (only on the remote control)

21. **COUNTER RESET button–** Press to reset counter to 0:00:00. (only on the remote control)

    EXIT button– Press to exit the menu on the TV screen. (only on the remote control)

22. **COUNTER MEMORY button–** Press to set counter memory on and off.(only on the remote control)

23. **SEARCH buttons**

    TIME SEARCH button– Time Search mode. For more information. (only on the remote control)

    INDEX SEARCH button– Index Search mode. For more information. (only on the remote control)

24. **MUTE button–** Press to mute the TV's sound. Press it again to resume the sound. (only on the remote control)

25. **VOLUME buttons–** Press to adjust the desired TV's volume level by using either ▲ or ▼ button. (only on the remote control)

26. **VCR/TV/CABLE buttons–** Press to select TV, VCR or Cable mode. (only on the remote control)

    VCR position: to operate the VCR or watch TV using the VCR tuner.

    TV position: to watch TV or to view one program while recording another.

    Cable position: Press to operate the cable converter box. When it has capability of operation with this remote control.(only on the remote control)

27. **Power cord–** Connect to a standard AC outlet (120V/60Hz).

28. **AUDIO OUT jacks–** Connect to the audio input jacks of your audio equipment or another VCR.

29. **AUDIO IN jacks–** Connect to the audio output jacks of your audio equipment or another VCR.

30. **ANT. IN terminal–** Connect to an antenna, Cable system or Satellite system.

31. **VIDEO OUT jack–** Connect to the video input jack of your video camera or another VCR.

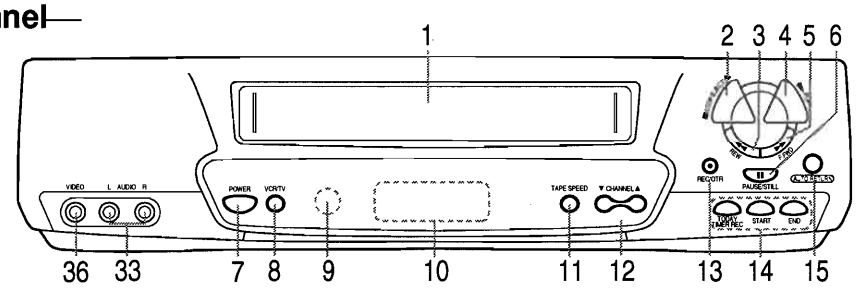
32. **VIDEO IN jack–** Connect to the video output jack of your video camera or another VCR.

33. **CH3/CH4 selector switch–** Use to select a video output channel (3 or 4) for VCR playback.

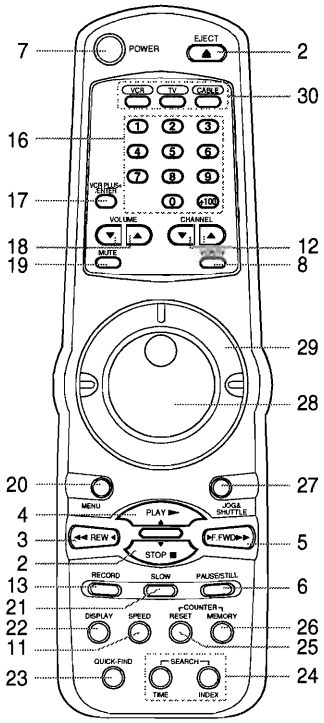
34. **ANT. OUT terminal–** Connects to the antenna input terminal on your TV.

Model: 2970LV

—VCR Front Panel—



—Remote Control—



Part no, : N9311UD

1. **Cassette Compartment**
2. **EJECT button–** Press to remove the tape from the VCR.

   STOP button– Press to stop the tape motion.

   ▼ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)
3. **REW button–** Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

   ◄ button– Press to cancel a setting of timer program. Press to correct digits when setting program (For example: setting clock or timer program). Press to add or delete channel numbers during channel preset. (only on the remote control)
4. **PLAY button–** Press to begin playback.

   ▲ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)
5. **F.FWD button–** Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

   ► button– When setting program (For example: setting clock or timer program), press to determine your selection and proceed to the next step you want to input. Press to determine the setting modes from the on screen menu. Press to add or delete channel numbers during channel preset. (only on the remote control)
6. **PAUSE/STILL button–** Press to temporarily stop the tape during recording or to view a still picture during playback.

   Frame Advance function– Press to advance the picture by one frame at a time during still mode.
7. **POWER button–** Press to turn VCR on and off. Press to activate timer recording.
8. **VCR/TV button–** Press to select TV or VCR mode.

   VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

   TV position: to watch TV or to view one program while recording another.
9. **Remote sensor window–** Receives the infrared signals from the remote control.
10. **Digital display**
11. **TAPE SPEED button–** Press to choose the desired recording speed : SP/SLP.
12. **CHANNEL ▲ or ▼ buttons–** Press to select the desired channels for viewing or recording.

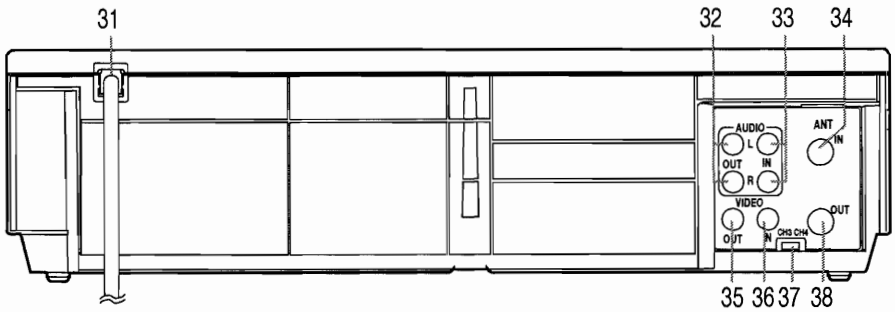
    Tracking function– Press to minimize video 'noise' (lines or dots on screen) during playback or slow mode.

    Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.
13. **RECORD button–** Press for manual recording.

    OTR button– Press to activate One Touch Recording. (only on the VCR)

Model: 2970LV

—Rear View—



14. **TODAY TIMER REC button–** Press to set a today timer program, or to check it. (only on the VCR)

    START button– Press to enter desired start time during today timer setting. (only on the VCR)

    END button– Press to enter desired end time during today timer setting. (only on the VCR)

15. **AUTO RETURN button–** Rewinds to the beginning of the timer recording.

16. **NUMBER buttons–** Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9. (only on the remote control)

    +100 button– When selecting cable channels which are higher than 99, press this button first, then press the last two digits. (To select channel 125, first press "+100" button then press "2" and "5"). (only on the remote control)

17. **VCR PLUS+ button–** Press to program the automatic timer recording using the VCR Plus+ system. (only on the remote control)

    ENTER button– Press to memorize the number corresponding to the brand of your TV as shown in the owner's manual. For example, If you have an RCA TV, press 0, then 8 button. then, press the ENTER button.(only on the remote control)

18. **VOLUME buttons–** Press to adjust the desired TV's volume level by using either ▲ or ▼ button. (only on the remote control)

19. **MUTE button–** Press to mute the TV's sound. Press it again to resume the sound. (only on the remote control)

20. **MENU button–** Press to display the menu on the TV screen. Press to exit the menu on the TV screen. (only on the remote control)

21. **SLOW button–** Press to start slow motion playback. The slow speed can be controlled by pressing the F.FWD button (faster) or REW button (slower). (only on the remote control)

22. **DISPLAY button–** Press to display the counter or the current channel number and the current time on the TV screen. (only on the remote control)

23. **QUICK-FIND button–** Press the MENU button until the SERCH SELECT menu appears and select Quick Find. (only on the remote control)

24. **SEARCH buttons**

    TIME SEARCH button– Time Search mode. For more information. (only on the remote control)

    INDEX SEARCH button– Index Search mode. For more information. (only on the remote control)

25. **COUNTER RESET button–** Press to reset counter to 0:00:00. (only on the remote control)

    EXIT button– Press to exit the menu on the TV screen. (only on the remote control)

26. **COUNTER MEMORY button–** Press to set counter memory on and off.(only on the remote control)

27. **JOG&SHUTTLE button–** Press to use the Jog Dial or the Shuttle Ring. (only on the remote control)

28. **Jog Dial–** Turn to advance one frame in the forward or backward direction at the speed with which the dial is turned during the Jog & Shuttle mode. (only on the remote control)

29. **Shuttle Ring–** Turn to make rewind or fast forward speed faster in the forward or backward direction during the Jog & Shuttle mode. The further the Shuttle Ring is rotated, the faster the playback speed. (only on the remote control)

30. **VCR/TV/CABLE buttons–** Controlling your cable converter box with rhe VCR's remote. Press to VCR or TV or Cable butten. (only on the remote control)

31. **Power cord–** Connect to a standard AC outlet (120V/60Hz).

32. **AUDIO OUT jacks–** Connect to the audio input jacks of your audio equipment or another VCR.

33. **AUDIO IN jacks–** Connect to the audio output jacks of your audio equipment or another VCR.

34. **ANT. IN terminal–** Connect to an antenna, Cable system or Satellite system.

35. **VIDEO OUT jack–** Connect to the video input jack of your video camera or another VCR.

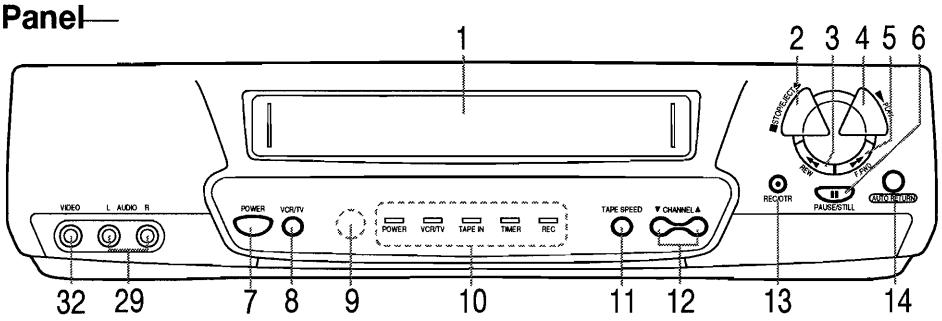
36. **VIDEO IN jack–** Connect to the video output jack of your video camera or another VCR.

37. **CH3/CH4 selector switch–** Use to select a video output channel (3 or 4) for VCR playback.

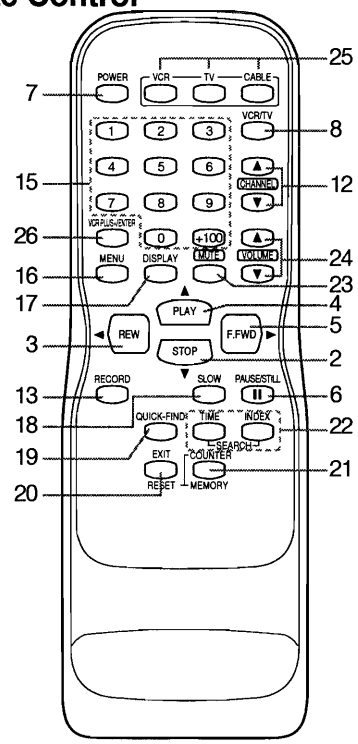
38. **ANT. OUT terminal–** Connects to the antenna input terminal on your TV.

Model: 2965LV

—VCR Front Panel—



—Remote Control—



Part No,: 2965LV

1. **Cassette Compartment**
2. **EJECT button–** Press to remove the tape from the VCR.(only on the VCR)

   STOP button– Press to stop the tape motion.

   ▼ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)
3. **REW button–** Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

   ◄ button– Press to cancel a setting of timer program. Press to correct digits when setting program (For example: setting clock or timer program). Press to add or delete channel numbers during channel preset. (only on the remote control)
4. **PLAY button–** Press to begin playback.

   ▲ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)
5. **F.FWD button–** Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

   ► button– When setting program (For example: setting clock or timer program), press to determine your selection and proceed to the next step you want to input. Press to determine the setting modes from the on screen menu. Press to add or delete channel numbers during channel preset. (only on the remote control)
6. **PAUSE/STILL button–** Press to temporarily stop the tape during recording or to view a still picture during playback.

   Frame Advance function– Press to advance the picture by one frame at a time during still mode.
7. **POWER button–** Press to turn VCR on and off. Press to activate timer recording.
8. **VCR/TV button–** Press to select TV or VCR mode.

   VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

   TV position: to watch TV or to view one program while recording another.
9. **Remote sensor window–** Receives the infrared signals from the remote control.
10. **Indicators**

    POWER indicator– Indicates that the power is turned on.

    VCR/TV indicator– Indicates that the VCR is in the VCR position.

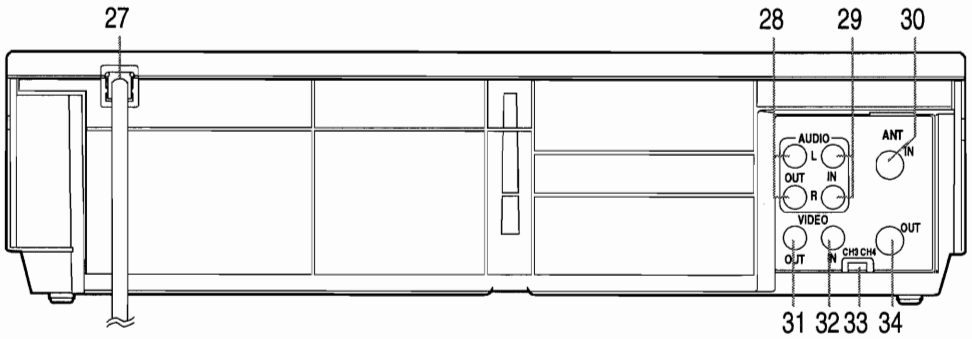
    TAPE IN indicator– Indicates that there is a tape in the VCR.

    TIMER indicator– Indicates that the timer recording or OTR has been set.

    REC indicator– Indicates that it is recording. Flashes when a recording has been paused.

Model: 2965LF

—Rear View—



11. **TAPE SPEED button–** Press to choose the desired recording speed : SP/SLP. (only on the VCR)
12. **CHANNEL ▲ or ▼ buttons–** Press to select the desired channels for viewing or recording.

    Tracking function– Press to minimize video 'noise' (lines or dots on screen) during playback or slow mode.

    Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.
13. **RECORD button–** Press for manual recording.

    OTR button–Press to activate One Touch Recording. (only on the VCR)
14. **AUTO RETURN button–** Rewinds to the beginning of the timer recording.
15. **NUMBER buttons–** Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9. (only on the remote control)

    +100 button– When selecting cable channels which are higher than 99, press this button first, then press the last two digits. (To select channel 125, first press "+100" button then press "2" and "5"). (only on the remote control)
16. **MENU button–** Press to display the menu on the TV screen. Press to exit the menu on the TV screen. (only on the remote control)
17. **DISPLAY button–** Press to display the counter or the current channel number and the current time on the TV screen. (only on the remote control)
18. **SLOW button–** Press to start slow motion playback. The slow speed can be controlled by pressing the F.FWD button (faster) or REW button (slower). (only on the remote control)
19. **QUICK-FIND button–** Press the MENU button until the SERCH SELECT menu appears and select Quick Find. (only on the remote control)
20. **COUNTER RESET button–** Press to reset counter to 0:00:00. (only on the remote control)

    EXIT button– Press to exit the menu on the TV screen. (only on the remote control)
21. **COUNTER MEMORY button–** Press to set counter memory on and off.(only on the remote control)
22. **SEARCH buttons**

    TIME SEARCH button– Time Search mode. For more information. (only on the remote control)

    INDEX SEARCH button– Index Search mode. For more information. (only on the remote control)
23. **MUTE button–** Press to mute the TV's sound. Press it again to resume the sound. (only on the remote control)
24. **VOLUME buttons–** Press to adjust the desired TV's volume level by using either ▲ or ▼ button. (only on the remote control)
25. **VCR/TV/CABLE buttons–** Controlling your cable converter box with rhe VCR's remote. Press to VCR or TV or Cable butten. (only on the remote control)
26. **VCR PLUS+ button–** Press to program the automatic timer recording using the VCR Plus+ system. (only on the remote control)

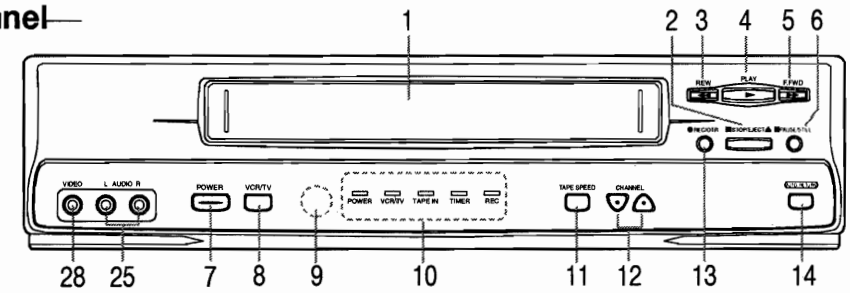
    ENTER button– Press to memorize the number corresponding to the brand of your TV as shown in the owner's manual. For example, If you have an RCA TV, press 0, then 8 button. then, press the ENTER button.(only on the remote control)
27. **Power cord–** Connect to a standard AC outlet (120V/60Hz).
28. **AUDIO OUT jacks–** Connect to the audio input jacks of your audio equipment or another VCR.
29. **AUDIO IN jacks–** Connect to the audio output jacks of your audio equipment or another VCR.
30. **ANT. IN terminal–** Connect to an antenna, Cable system or Satellite system.
31. **VIDEO OUT jack–** Connect to the video input jack of your video camera or another VCR.
32. **VIDEO IN jack–** Connect to the video output jack of your video camera or another VCR.
33. **CH3/CH4 selector switch–** Use to select a video output channel (3 or 4) for VCR playback.
34. **ANT. OUT terminal–** Connects to the antenna input terminal on your TV.

Model: VR-69WF

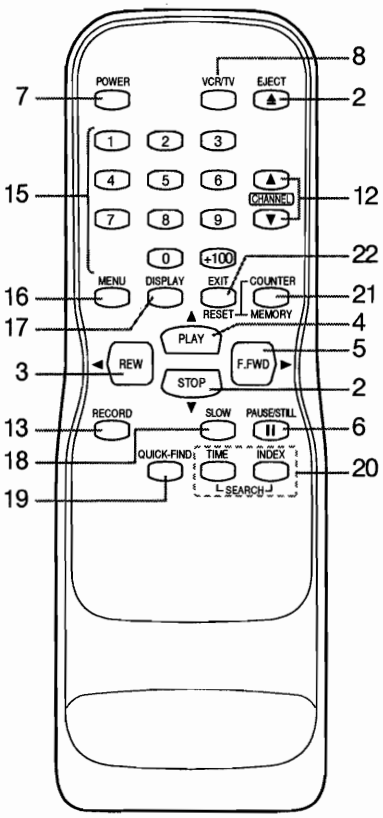
NOTE:

We do not recommend the use of universal remote controls. Not all of the functions may be controlled with a universal remote control. If you decide to use a universal remote control with this unit, please be aware that the code number given may not operate this unit. In this case, please call the manufacturer of the universal remote control.

—VCR Front Panel—



—Remote Control—



Part No, : N9381UD

1. **Cassette Compartment**
2. **EJECT button–** Press to remove the tape from the VCR.

   STOP button– Press to stop the tape motion.

   ▼ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)

3. **REW button–** Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

   ◄ button– Press to cancel a setting of timer program. Press to correct digits when setting program (For example: setting clock or timer program). Press to add or delete channel numbers during channel preset. (only on the remote control)

4. **PLAY button–** Press to begin playback.

   ▲ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)

5. **F.FWD button–** Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

   ► button– When setting program (For example: setting clock or timer program), press to determine your selection and proceed to the next step you want to input. Press to determine the setting modes from the on screen menu. Press to add or delete channel numbers during channel preset. (only on the remote control)

6. **PAUSE/STILL button–** Press to temporarily stop the tape during recording or to view a still picture during playback.

   Frame Advance function– Press to advance the picture by one frame at a time during still mode.

7. **POWER button–** Press to turn VCR on and off. Press to activate timer recording.
8. **VCR/TV button–** Press to select TV or VCR mode.

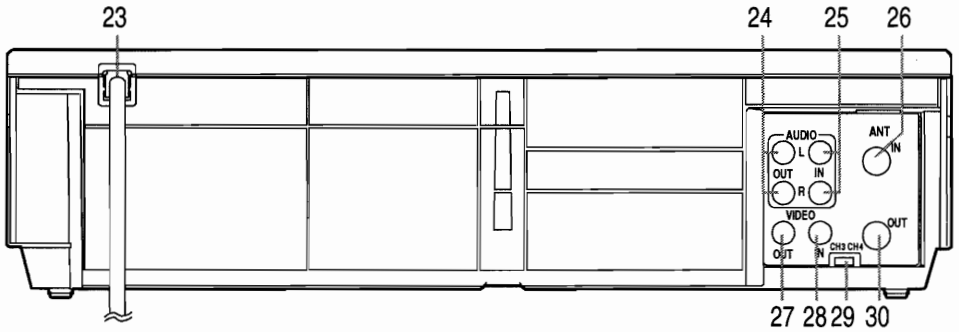
   VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

   TV position: to watch TV or to view one program while recording another.

9. **Remote sensor window–** Receives the infrared signals from the remote control.

Model: VR-69WF

—Rear View—



10. Indicators

POWER indicator– Indicates that the power is turned on.

VCR/TV indicator– Indicates that the VCR is in the VCR position.

TAPE IN indicator– Indicates that there is a tape in the VCR.

TIMER indicator– Indicates that the timer recording or OTR has been set.

REC indicator– Indicates that it is recording. Flashes when a recording has been paused.

11. TAPE SPEED button– Press to choose the desired recording speed : SP/SLP. (only on the VCR)

12. CHANNEL ▲ or ▼ buttons– Press to select the desired channels for viewing or recording.

Tracking function– Press to minimize video 'noise' (lines or dots on screen) during playback or slow mode.

Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.

13. RECORD button– Press for manual recording.

OTR button– Press to activate One Touch Recording. (only on the VCR)

14. AUTO RETURN button–Rewinds to the beginning of the timer recording.

15. NUMBER buttons– Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9. (only on the remote control)

+100 button– When selecting cable channels which are higher than 99, press this button first, then press the last two digits. (To select channel 125, first press "+100" button then press "2" and "5"). (only on the remote control)

16. MENU button– Press to display the menu on the TV screen. Press to exit the menu on the TV screen. (only on the remote control)

17. DISPLAY button– Press to display the counter or the current channel number and the current time on the TV screen. (only on the remote control)

18. SLOW button– Press to start slow motion playback. The slow speed can be controlled by pressing the F.FWD button (faster) or REW button (slower). (only on the remote control)

19. QUICK-FIND button– Press the MENU button until the SERCH SELECT menu appears and select Quick Find. (only on the remote control)

20. SEARCH buttons

TIME SEARCH button– Time Search mode. For more information.(only on the remote control)

INDEX SEARCH button– Index Search mode. For more information.(only on the remote control)

21. COUNTER MEMORY button– Press to set counter memory on and off.(only on the remote control)

22. COUNTER RESET button– Press to reset counter to 0:00:00. (only on the remote control)

EXIT button– Press to exit the menu on the TV screen. (only on the remote control)

23. Power cord– Connect to a standard AC outlet (120V/60Hz).

24. AUDIO OUT jacks– Connect to the audio input jacks of your audio equipment or another VCR.

25. AUDIO IN jacks– Connect to the audio output jacks of your audio equipment or another VCR.

26. ANT. IN terminal– Connect to an antenna, Cable system or Satellite system.

27. VIDEO OUT jack– Connect to the video input jack of your video camera or another VCR.

28. VIDEO IN jack– Connect to the video output jack of your video camera or another VCR.

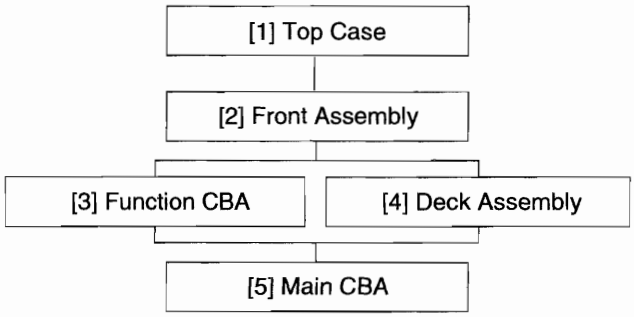
29. CH3/CH4 selector switch– Use to select a video output channel (3 or 4) for VCR playback.

30. ANT. OUT terminal– Connects to the antenna input terminal on your TV.

CABINET DISASSEMBLY INSTRUCTIONS

1. Disassembly Flowchart

This flowchart indicates the disassembly steps to gain access to item(s) to be serviced. When reassembling, follow the steps in reverse order. Bend, route, and dress the cables as they were originally.



Disassembly Method

ID/ LOC. No.	PART	REMOVAL		
		Fig. No.	REMOVE/ *UNHOOK/UNLOCK/ RELEASE/UNPLUG/ DESOLDER	Note
[1]	Top Case	1	3(S-1)	-
[2]	Front Assembly	2, 3	*7(L-1)	1
[3]	Function CBA	2, 4	*(L-2), (CN507)	2
[4]	Deck Assembly	5	5(S-2), (CN501, CN502, CN503, CN505)	3
[5]	Main CBA	4, 6	2(S-3), *3(L-3)	4
↓ ①	↓ ②	↓ ③	↓ ④	↓ ⑤

①: Identification (location) No. of parts in the figures

②: Name of the part

③: Figure Number for reference

④: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, L=Locking Tab, S=Screw,
CN=Connector
*=Unhook, Unlock, Release, Unplug, or Desolder
e.g. 2(S-2) = two Screws (S-2),
2(L-2) = two Locking Tabs (L-2)

⑤:Refer to "Reference Notes."

Reference Notes

CAUTION: Locking Tabs (L-1) are fragile. Be careful not to break them.

1. Release 7 Locking Tabs (L-1). To do this, first release three Locking Tabs (A) at the bottom, and then four Locking Tabs (B) at the top. (Fig. 2, 3)
2. Disconnect Connector (CN507) to remove Function CBA. Hold Main CBA while pulling up on the Function CBA. (Fig. 4)
3. Remove 5 Screws (S-2). Then slowly lift the Deck Assembly up. Lifting Deck Assembly disconnects 4 Connectors (CN501, CN502, CN503, CN505). (Fig. 5)
4. When reassembling the unit, always reinsert Locking Tabs (L-3), and then reinstall Screws (S-3). These screws are critical for proper shielding of the Main CBA. (Fig. 6)

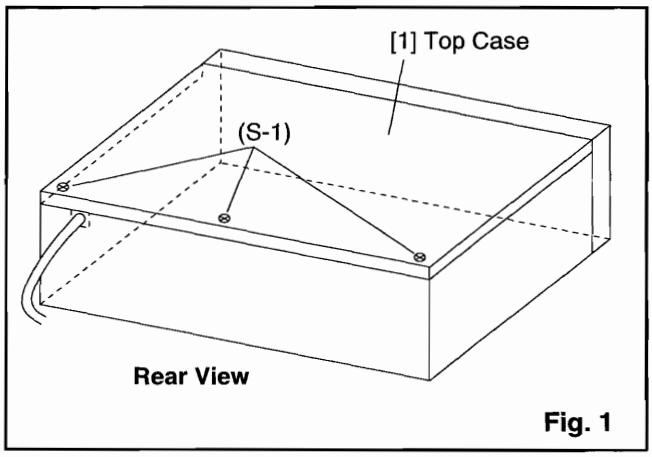


Fig. 1

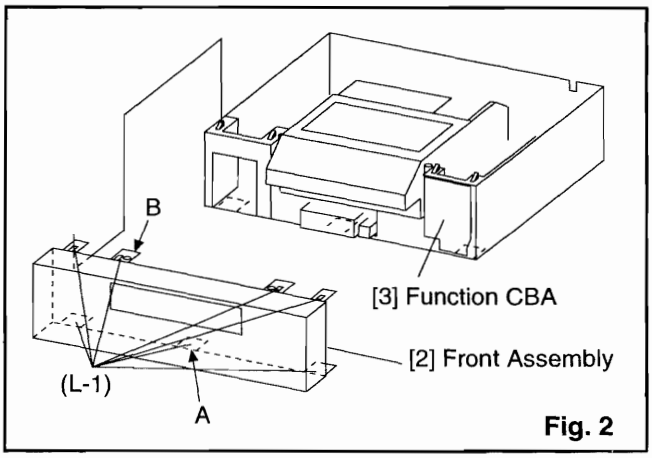


Fig. 2

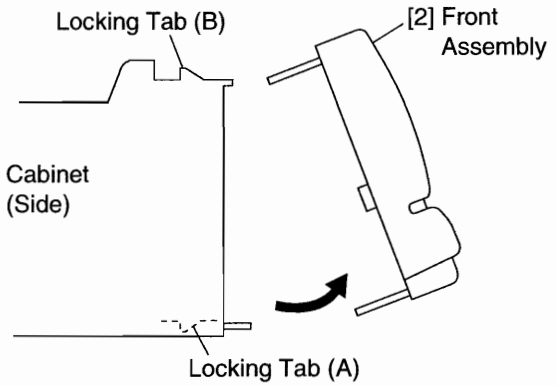


Fig. 3

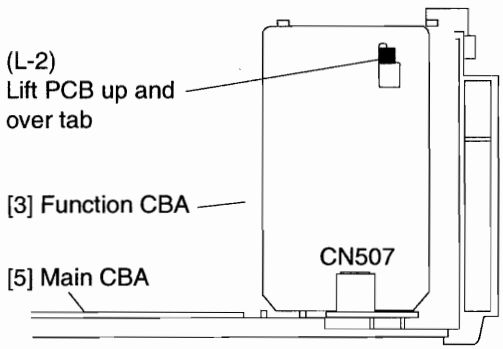


Fig. 4

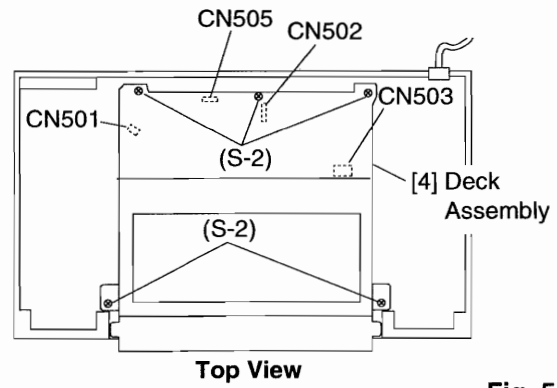


Fig. 5

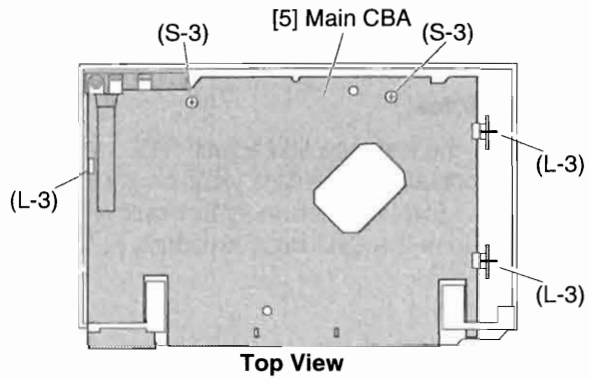


Fig. 6

ELECTRICAL ADJUSTMENT INSTRUCTIONS

General Note: "CBA" is an abbreviation for "Circuit Board Assembly."

Notes:

1. Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to do these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.
2. To perform these alignment / confirmation procedures, make sure that the tracking control is set in the center position: Press either channel "▼" or "▲" button first, then the "PLAY" button (VCR's Front Panel only).

Test Equipment Required

1. Oscilloscope: Dual-trace with 10:1 probe, V-Range: 0.001~50V/Div., F-Range: DC~AC-20MHz
2. NTSC Pattern Generator (color bar with 100% white)
3. Audio Generator
4. USA TV Multi Channel Sound Generator
5. TV Modulator
6. TV UP Converter
7. Video Pattern Generator
8. Alignment Tape (FL8A)
9. Blank Tape (Available Locally)
10. TV Monitor

1. Head Switching Position Adjustment

Purpose:

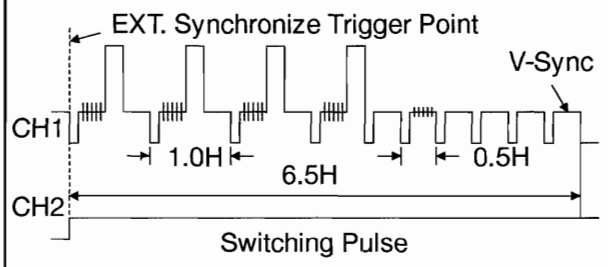
To determine the Head Switching point during playback.

Symptom of Misadjustment:

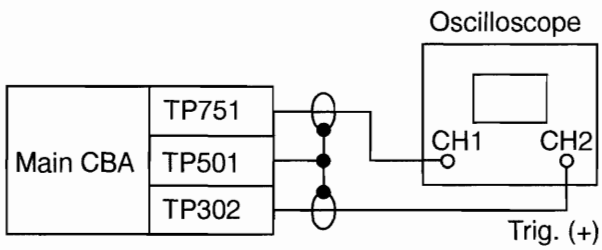
May cause Head Switching noise or vertical jitter in the picture.

Test Point	Adj. Point	Mode	Input
TP751(V-OUT) TP302(RF-SW) TP501(GND)	VR501 (Switching Point)	PLAY (SP)	----
Tape	**Measurement Equipment**	**Spec.**	
FL8A	Oscilloscope	6.5H±1H (412.7μs±60μs)	

Figure 1



Connections of Measurement Equipment



Reference Notes:

Play back the test tape and adjust VR501 so that the V-sync front edge of the CH1 video output waveform is at the 6.5H(412.7μs) delayed position from the rising edge of the CH2 head switching pulse waveform.

Separation Adjustment (2965LF/2965LV/2970LV/VR-69WF Model only)

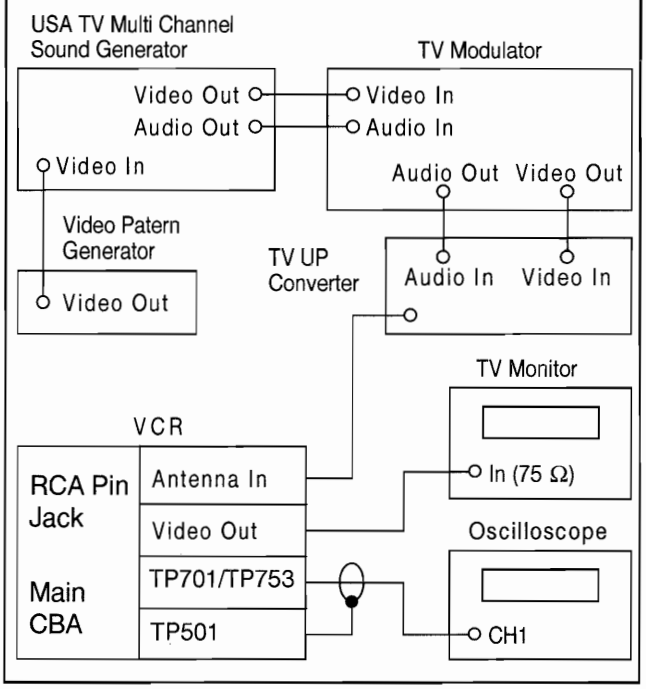
Caution: Do not attempt to do this adjustment without the specified equipment.

Purpose: To set the audio output level of the tuner properly.

Symptom of Misadjustment: Audio signal of L ch and R ch may be mixed under E-E and/or Rec mode.

Test Point	Adj. Point	Mode	Input
Antenna In Video Out TP501(GND) TP701(MPX) TP753(R ch)	VR701 (MPX) VR901 (300Hz) VR902 (3kHz) (MAIN CBA)	E-E	Color Bar with 100% White, 87.5% 3kHz/300Hz Stereo (L ch Only) 20%(-13.9dB) modulation 1kHz mono 100% 100mVrms (283mVp-p)
Tape	**Measurement Equipment**	**Spec.**	
—	TV Monitor/ Oscilloscope/ USA TV Multi Channel Sound Generator/ TV Modulator/ TV Up Converter/ Video Pattern Generator	—	

Connections of Measurement Equipment



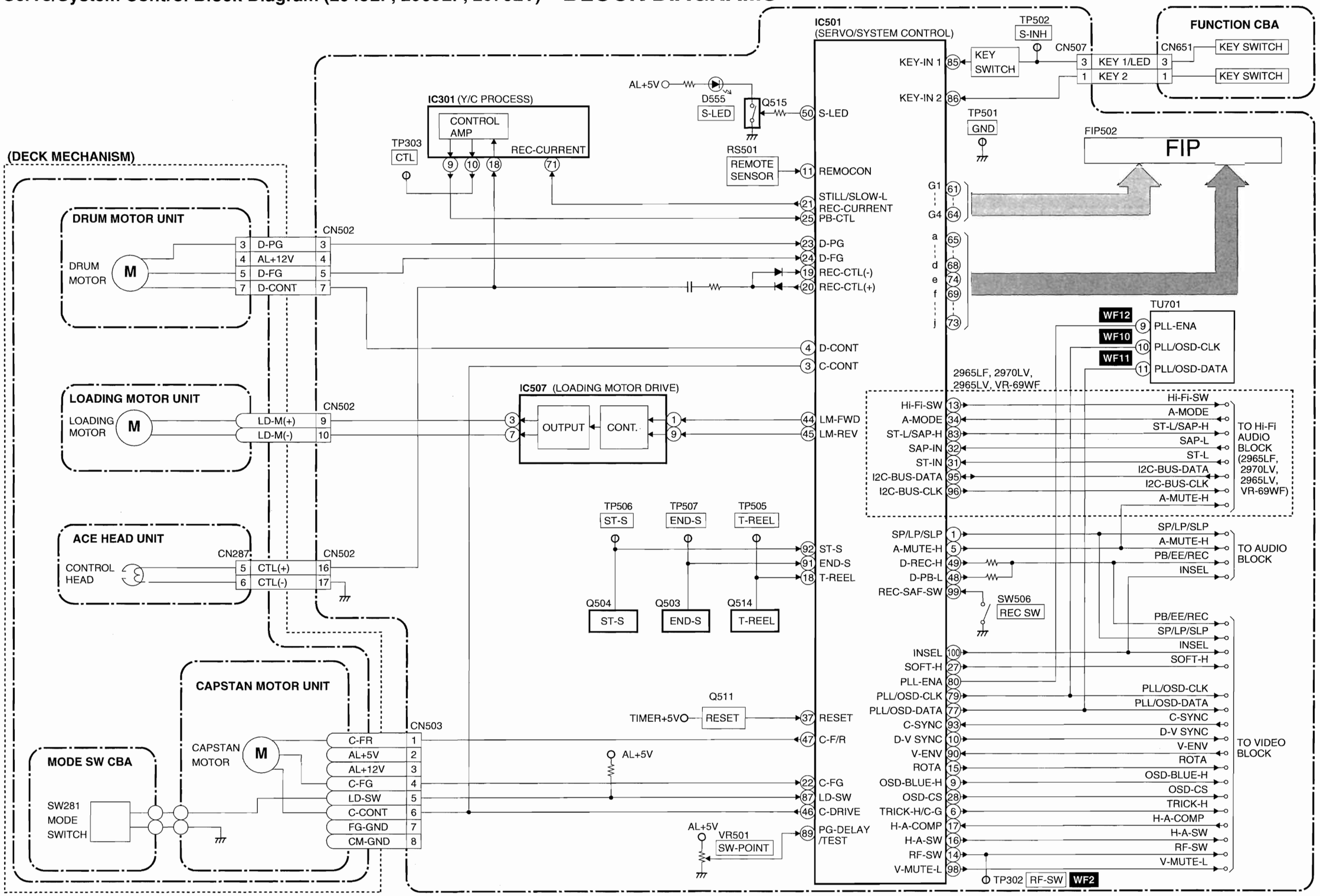
Reference Notes:

1. Output the color bar with 100% white from the video pattern generator, then make 87.5% modulation by the TV modulator.
2. Output the 1kHz Mono 100% signal from the sound generator, then set 25kHz deviation exactly by the sound generator.
3. Connect the Oscilloscope to TP701.
4. Adjust VR701 so that the output level becomes 100mVrms (283mVp-p).
5. Set the sound generator to:

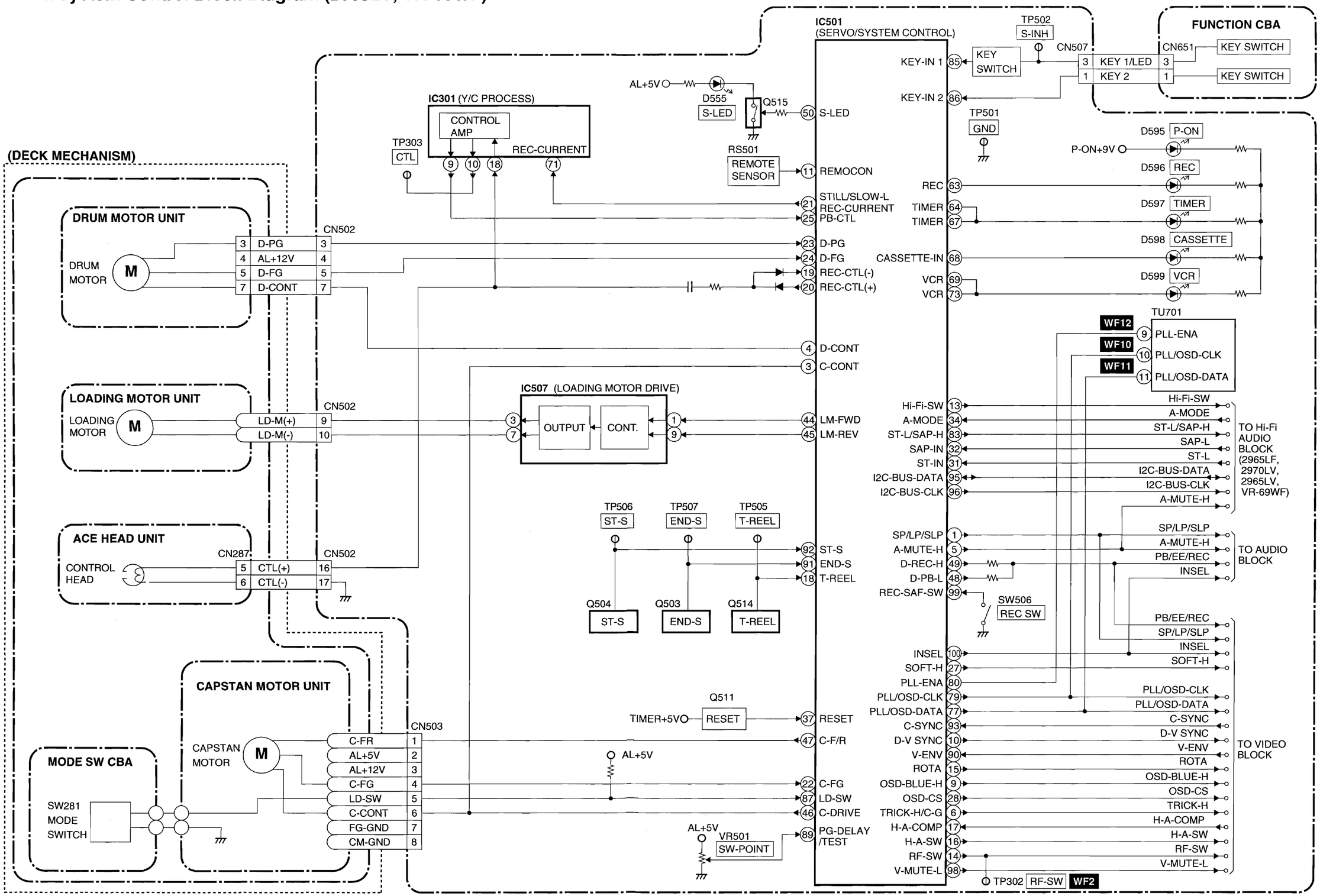
   Tone: 300Hz, Modulation: 20% (-13.9 dB), Pilot: ON, NR: IN, PRE-EN: IN, L only mode.
6. Set the TV up converter to 70dBμ, ch10 (193.25 kHz) then set the channel of the VCR to ch10.
7. Connect the Oscilloscope to TP753.
8. Confirm the word "STEREO" appears on the TV monitor. Adjust VR901 to obtain minimum level of R ch.
9. Set the sound generator to:

   Tone: 3kHz, Modulation: 20% (-13.9 dB), Pilot: ON, NR: IN, PRE-EN: IN, L only mode.
10. Set the TV up converter to 70dBμ, ch10 (193.25 kHz) then set the channel of the VCR to ch10.
11. Connect the Oscilloscope to TP753.
12. Confirm the word "STEREO" appears on the TV monitor. Adjust VR902 to obtain minimum level of R ch.
13. Repeat steps 5 through 12 several times for best results.

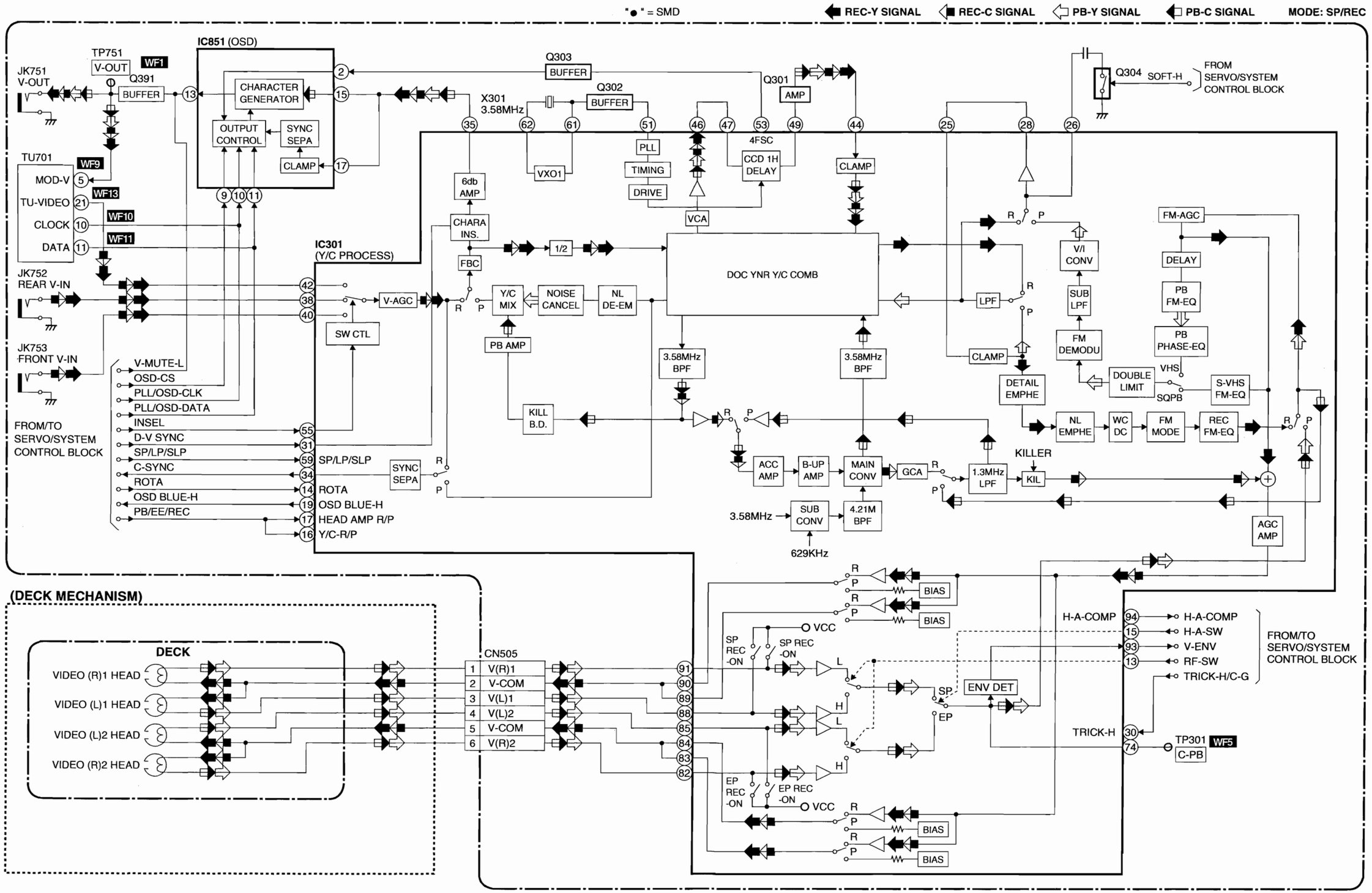
Servo/System Control Block Diagram (2945LF, 2965LF, 2970LV)



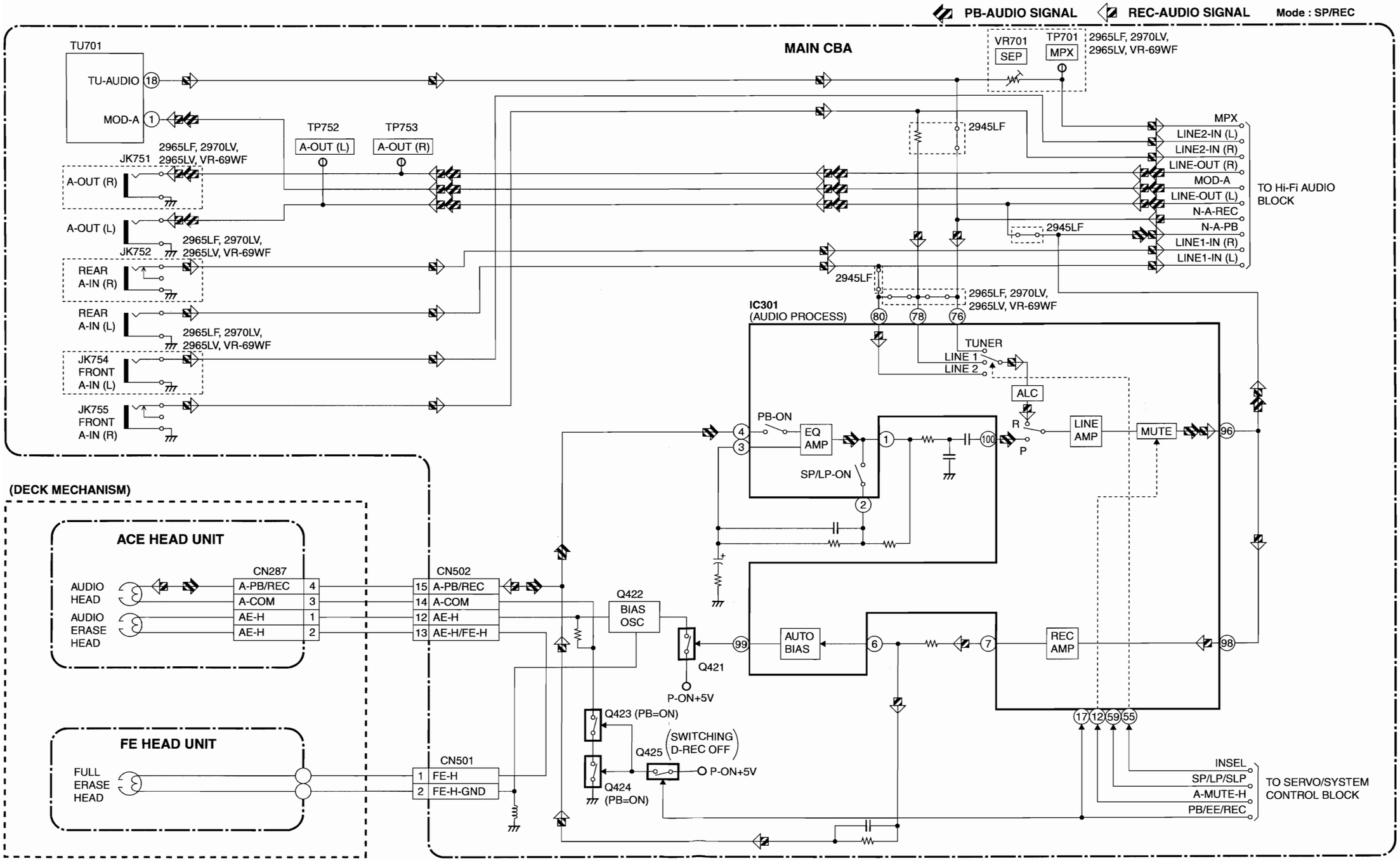
Servo/System Control Block Diagram (2965LV, VR-69WF)



Video Block Diagram



Audio Block Diagram

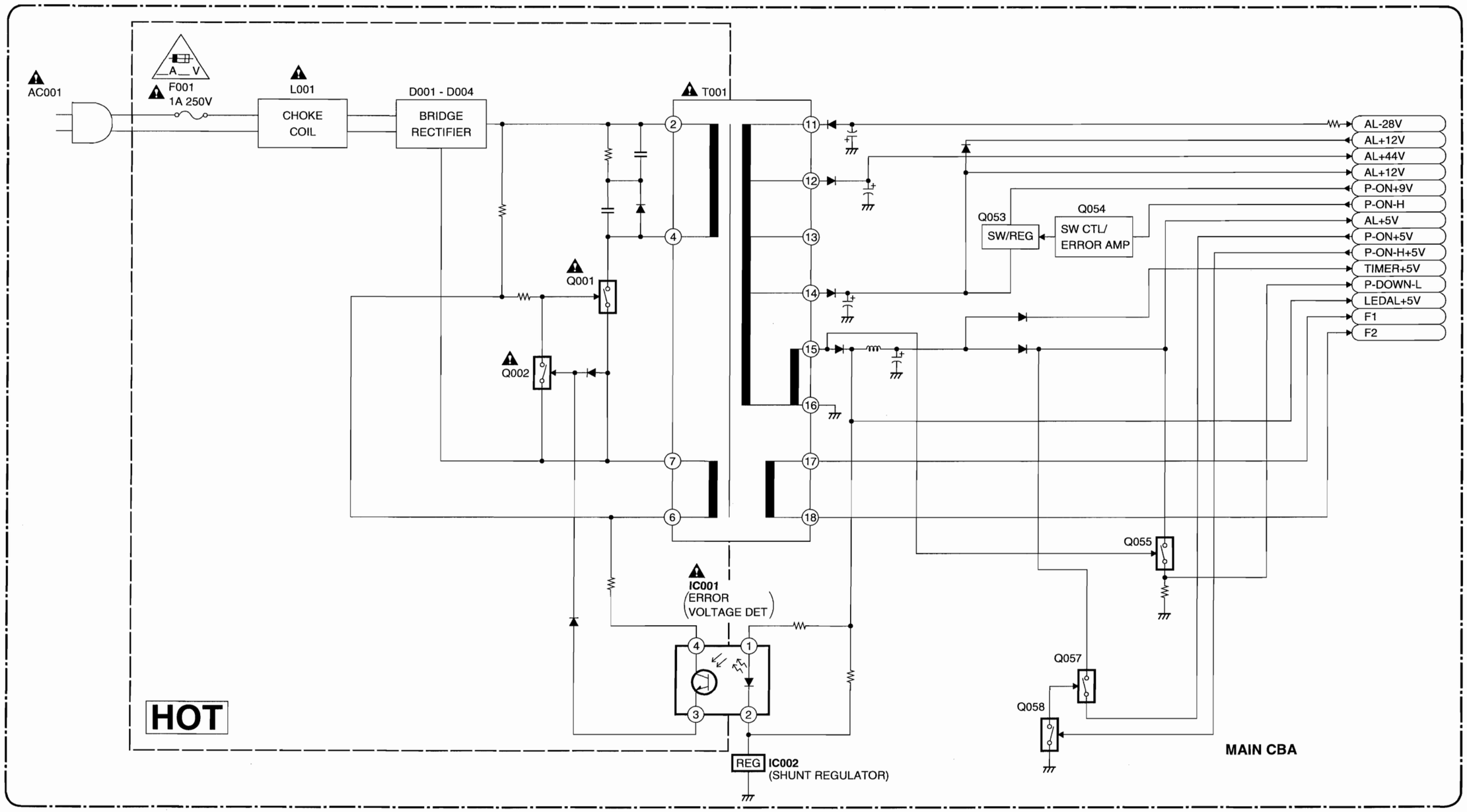


Power Supply Block Diagram

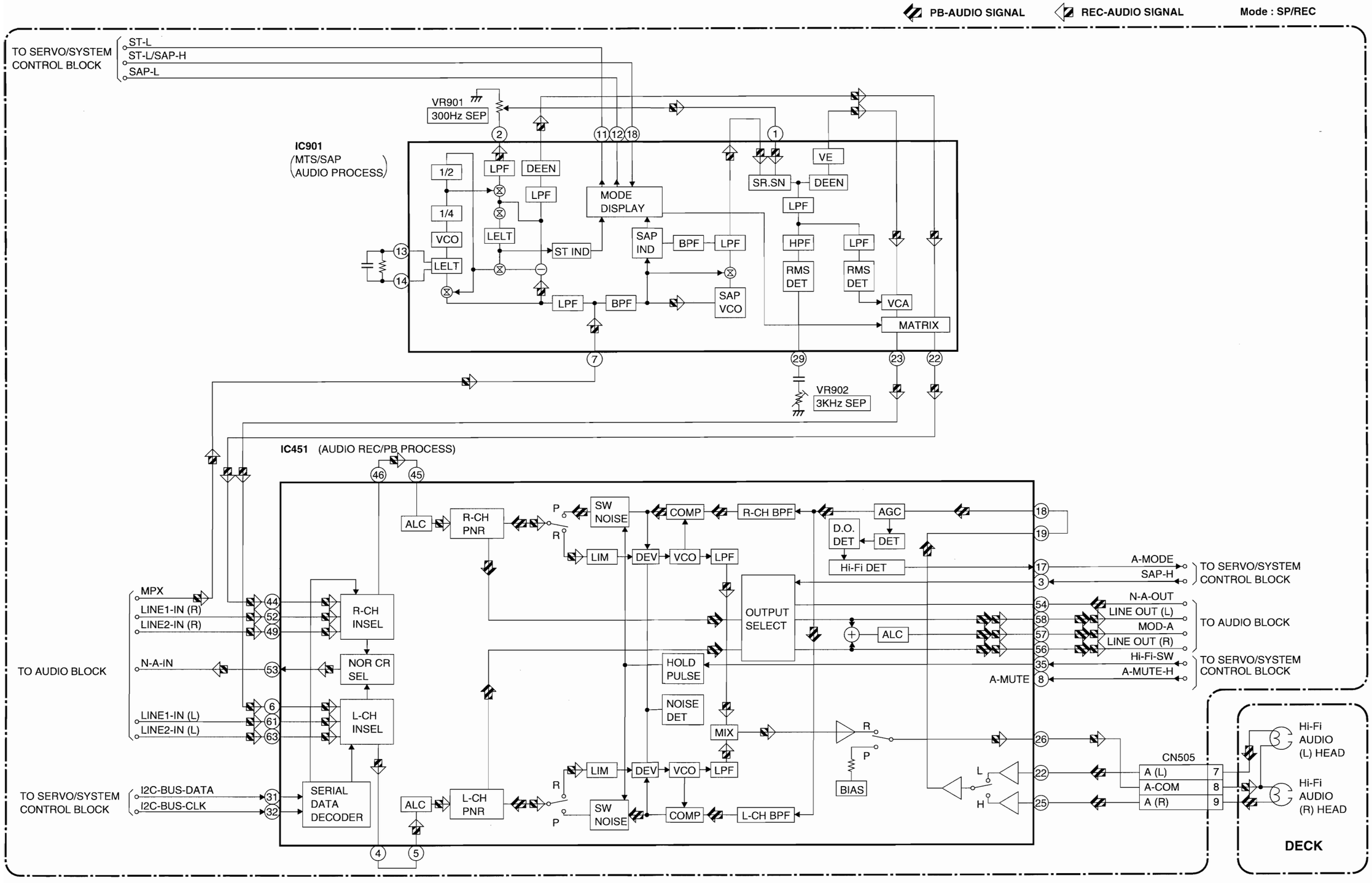
NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES
D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE -REPLACE FUSE AS MARKED.
"This symbol means fast operating fuse."
"Ce symbole reprèsente un fusible à fusion rapide."

CAUTION !
Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.



Hi-Fi Audio Block Diagram (2965LF, 2970LV, 2965LV, VR-69WF)



Function Indicator Symbols

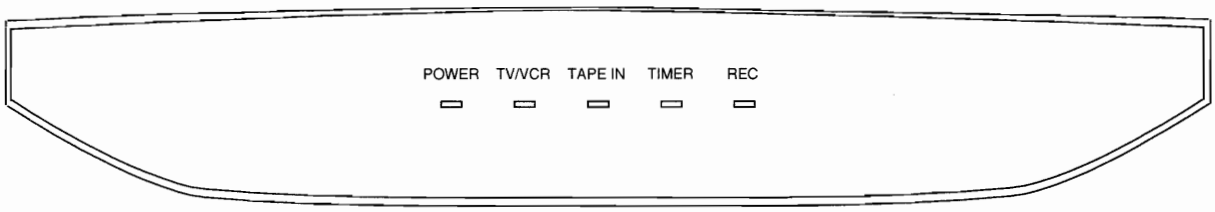
Note:

The following symbols will appear on the indicator panel to indicate the current mode or operation of the VCR. On-screen modes will also be momentarily displayed on the tv screen when you press the operation buttons.

Models: 2965LV/VR-69WF

Display panel

" H "= LED Light on, " L "= LED Light off

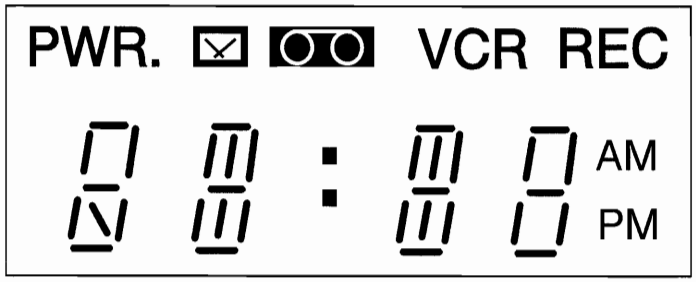


Led Mode	Indicator Active	
POWER	Power on = " H " Power off = " L "	
TV/VCR	VCR mode = " H " TV mode = " L "	
TAPE IN	Cassette in = " H " Cassette out = " L "	
1. When reel and capstan mechanism is not functioning correctly	Cassette in	Blinks at 0.8Hz interval
2. When tape loading mechanism is not functioning correctly	Cassette in	Blinks at 1.6Hz interval
3. When cassette loading mechanism is not functioning correctly	Cassette in	Blinks at 3.2Hz interval
4. When the drum is not working properly	Cassette in	Blinks at 6.4Hz interval
TIMER	Timer stand by = " H " One touch recording = " H " Timer recording = " H " General mode = " L "	
REC	REC mode = " H " REC pause General mode = " L "	Blinks at 0.8Hz interval

Models: 2945LF/2965LF/2970LV

Display panel

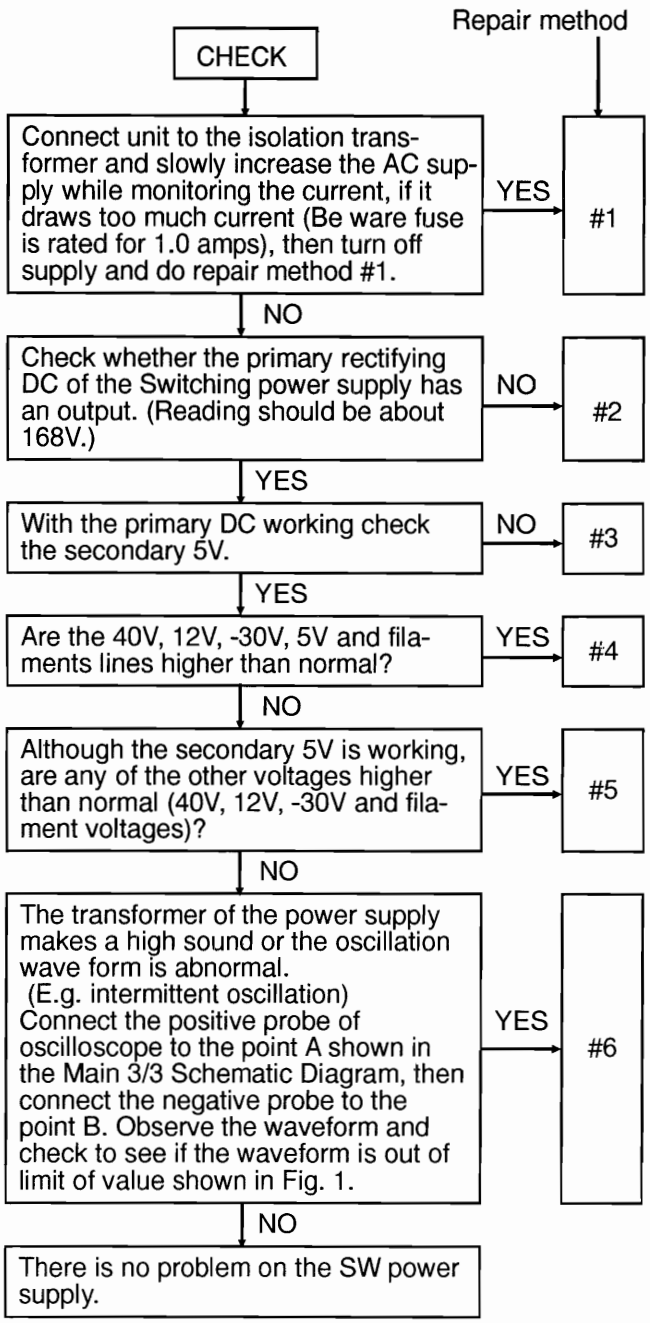
Note: Briefly (5 seconds) displays which feature the VCR is currently performing.



LED MODE	INDICATOR ACTIVE		
CASSET "IN" CASSET "OUT"	 		ON OFF
VCR/TV VCR MODE VCR/TV TV MODE	" VCR " " VCR "		ON OFF
CLOCK	" 88:88 " " AM " " PM "		ON ON
POWER ON	" PWR "		ON
REC	" REC "		ON
REC PAUSE	" REC "		Blinks at 0.8Hz interval
T-REC, OTR			ON (T-REC OFF, T-REC incomplete Blinks at 0.8Hz interval)
AUTE RETURN			Blinks at 0.8Hz interval)
When reel and capstan mechanism is not functioning correctly		" No. 1(grid 1)	Blinks at 0.8Hz interval
When tape loading mechanism is not functioning correctly		" No. 2(grid 1)	Blinks at 0.8Hz interval
When cassette loading mechanism is not functioning correctly		" No. 3(grid 1)	Blinks at 0.8Hz interval
When the Drum is not working properly		" No. 4(grid 1)	Blinks at 0.8Hz interval
S-INH condition	ALL MODE		Blinks at 0.8Hz interval

Power Supply Trouble Shooting Guide

It is highly recommended that a variable isolation transformer which can monitor current be used. (Alternatively a variable AC source which monitors current will do). Read directions below before power is added!


Repair method
CHECK
Connect unit to the isolation transformer and slowly increase the AC supply while monitoring the current, if it draws too much current (Be ware fuse is rated for 1.0 amps), then turn off supply and do repair method #1.
YES
#1
NO
Check whether the primary rectifying DC of the Switching power supply has an output. (Reading should be about 168V.)
NO
#2
YES
With the primary DC working check the secondary 5V.
NO
#3
YES
Are the 40V, 12V, -30V, 5V and filaments lines higher than normal?
YES
#4
NO
Although the secondary 5V is working, are any of the other voltages higher than normal (40V, 12V, -30V and filament voltages)?
YES
#5
NO
The transformer of the power supply makes a high sound or the oscillation wave form is abnormal.
(E.g. intermittent oscillation)
Connect the positive probe of oscilloscope to the point A shown in the Main 3/3 Schematic Diagram, then connect the negative probe to the point B. Observe the waveform and check to see if the waveform is out of limit of value shown in Fig. 1.
YES
#6
NO
There is no problem on the SW power supply.

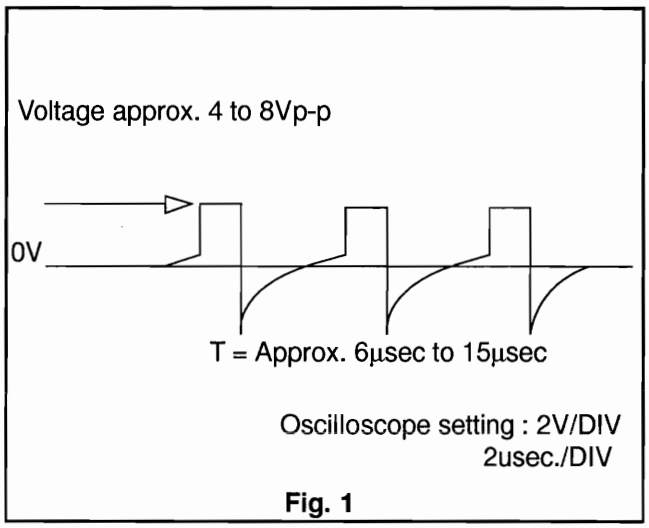


Fig. 1

Repair method #1

(Power must be off)

Short circuit in the secondary side. check diode D013 and {(FIP display model only: D012, D015, D016 and D017) or (LED display model only: D015 and D016)}, switching transistor (Q001), control transistor (Q002), diode (D006), and resistor (R014) replace as necessary.

Disconnect 40V diode (D013), 12V diode (D015), 5V diode (D016) and {FIP display model only: -30V diode (D012) and filament voltage diode (D017)}Check the load continuity of 40V line, 12V line, 5V line and filament voltage line through a tester (resistance range).

If the tester indicates a lower resistance value around 0 ohm, the line is short-circuited.

Before repairing the switching power supply, find out the short-circuited area of such line and repair it.

If the tester does not indicate any low resistance value (around 0 ohm), no load is short-circuited and there is no problem.

2] Check for any defective parts while the secondary rectifying diodes are disconnected (D013, D015, D016 and {FIP display model only: D012 and D017)} perform a diode check in both forward and reverse directions through a tester.

3] Remove the following components and check for defects: snubber diode (D005), switching transistor (Q001), emitter resistor (R014), control transistor (Q002).

Repair method #2

Check the fuse 1.0A (F001), primary rectifying diodes (D001-D004) as possible problems. Remove the above mentioned parts and check them. The circuit which turns on switching transistor (Q001) may be regarded as a possible cause, even if the load at the secondary side is shorted, it can't be detected because switching transistor (Q001) isn't operating. Perform check according to the step 1 and 2 of repair method #1 and check the following parts:

(Remove the part from PCB)

Switching transistor (Q001), emitter resistor (R014), VB diode (D008). base resistor 120 ohm (R008) and start resistor (R004 and R005).

Repair method #3

A circuit to turn on switching transistor (Q001) may not work and this may be regarded as a cause of trouble. Even if the load at the secondary side is short-circuited, it cannot be detected because switching transistor (Q001) does not turn on. Therefore, perform check according to the steps 1] and 2] of the repair method #1 and execute the under-mentioned parts breakage check.

(Remove the part from PCB.)

switching transistor (Q001), emitter resistor (R014), control transistor (Q002), VB diode (D008), base resistor 120 ohm (R008) and start resistor (R004 and R005).

Repair method #4

The feedback circuit which is monitored by the output of D016 5V may not work and this may be regarded as a possible cause, remove control transistor Q002 and check for defects. More over, a photo coupler (IC001) and regulator (IC002) may be defective, replace any defective parts with factory originals.

Repair method #5

If the output voltage of the secondary side is slightly high, the line load may be in the "OPEN" state and this may be regarded as a cause of trouble. If there is no output voltage on the secondary side, the rectifying diodes (D013), (D015) and {FIP display model only only: (D012) and (D017)} may be defective.

Repair method #6

Check R012, R016, C008 and R015, for possible problems.

SCHEMATIC DIAGRAMS / CBA'S AND TEST POINTS

Standard Notes

Warning

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark " ⚠ " in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

Note:

1. Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
2. All resistance values are indicated in ohms ($K=10^3$, $M=10^6$).
3. Resistor wattages are 1/4W or 1/6W unless otherwise specified.
4. All capacitance values are indicated in μF ($P=10^{-6}\mu F$).
5. All voltages are DC voltages unless otherwise specified.

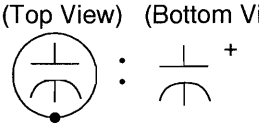
Capacitor Temperature Markings

Mark	Capacity change rate	Standard temperature	Temperature range
(B)	±10%	20°C	-25~+85°C
(F)	+30 -80%	20°C	-25~+85°C
(SR)	±15%	20°C	-25~+85°C
(Z)	+30 -80%	20°C	-10~+70°C

Capacitors and transistors are represented by the following symbols.

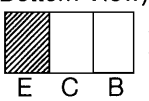
CBA Symbols

(Top View) (Bottom View)



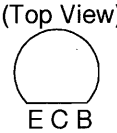
: Electrolytic Capacitor

(Bottom View)



: Transistor or Digital Transistor

(Top View)



NPN Transistor

(Top View)

PNP Transistor

(Top View)

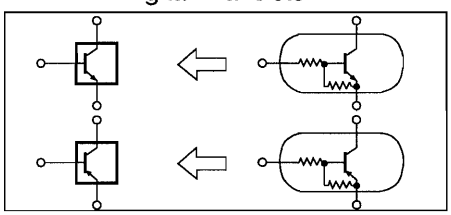
NPN Digital Transistor

(Top View)

PNP Digital Transistor

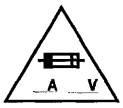
Schematic Diagram Symbols

Digital Transistor



LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:

1. **CAUTION:**



FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

2. **CAUTION:**

This symbol means fast operating fuse.
Ce symbole représente un fusible à fusion rapide.

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

3. **Note:**

(1) Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.

(2) To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

4. Wire Connectors

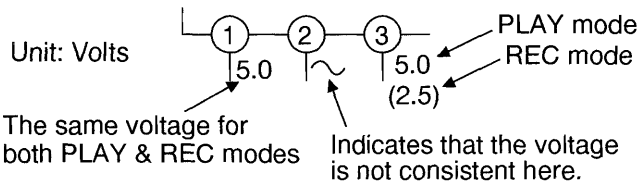
(1) Prefix symbol "CN" means "connector" (can disconnect and reconnect).

(2) Prefix symbol "CL" means "wire-solder holes of the PCB" (wire is soldered directly).

5. Note: Mark "•" is a leadless (chip) component.

6. Mode: SP/REC

7. Voltage indications for PLAY and REC modes on the schematics are as shown below:

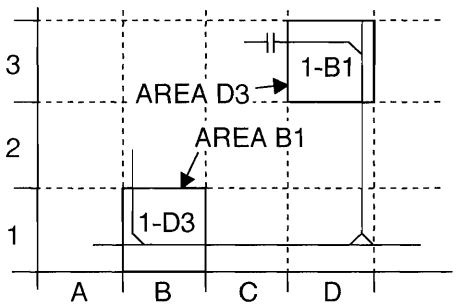


8. How to read converged lines

1-D3
Distinction Area
Line Number
(1 to 3 digits)

Examples:

1. "1-D3" means that line number "1" goes to area "D3".
2. "1-B1" means that line number "1" goes to area "B1".



9. Test Point Information

: Indicates a test point with a jumper wire across a hole in the PCB.

: Used to indicate a test point with a component lead on foil side.

: Used to indicate a test point with no test pin.

: Used to indicate a test point with a test pin.

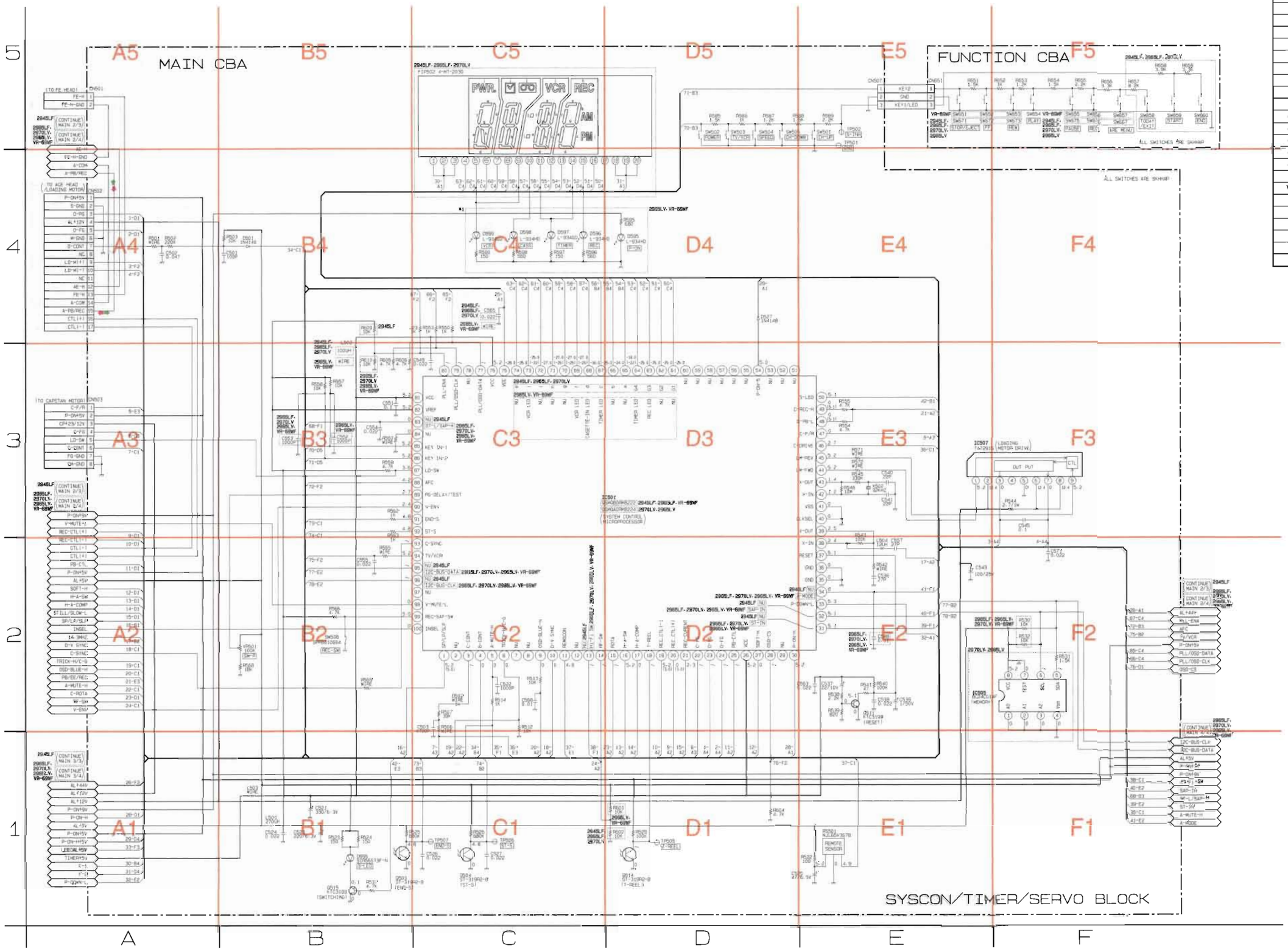
Main 1/3 Schematic Diagram (2945LF)
/Main 1/4 Schematic Diagram (2965LF, 2970LV, 2965LV, VR-69WF)

*1 **Note:**
When it is necessary to replace one or more of the following Diodes, all five should be replaced: D595, D596, D597, D598, D599.

Audio(REC) Audio(PLAY)

Main 1/3 Schematic Diagram
(2945LF)
Main 1/4 Schematic Diagram
(2965LF, 2970LV, 2965LV, VR-69WF)

REF.NO	POSITION
ICS	
IC501	D-3
IC507	F-3
TRANSISTORS	
Q503	B-1
Q504	C-1
Q511	E-1
Q514	D-1
Q515	B-1
CONNECTORS	
CN501	A-5
CN502	A-4
CN503	A-3
CN507	E-5
CN651	E-5
MISCELLANEOUS	
VR 501	B-2
TEST POINTS	
TP501	E-5
TP502	E-5
TP505	D-1
TP506	C-1
TP507	C-1



H3864/64/65/66/H10D 01 F/R

Main 2/3 Schematic Diagram (2945LF)
/Main 2/4 Schematic Diagram (2965LF, 2970LV, 2965LV, VR-69WF)

Luminance + Chrominance(REC)
Luminance(REC)
Chrominance(REC)
Audio(REC)
Luminance + Chrominance(Play)
Luminance(Play)
Chrominance(Play)
Audio(PLAY)

MAIN CBA

TUNER BLOCK

OSD BLOCK

INSEL BLOCK

Main 2/3 Schematic Diagram
(2945LF)
Main 2/4 Schematic Diagram
(2965LF, 2970LV, 2965LV, VR-69WF)

REF.NO	POSITION
ICS	
IC301	H-2
IC851	L-3
TRANSISTORS	
Q301	J-3
Q302	J-4
Q303	J-4
Q304	J-1
Q305	H-1
Q391	L-2
Q392	L-2
Q421	H-1
Q422	H-1
Q423	H-1
Q424	H-1
Q425	H-1
CONNECTORS	
CN505	G-4
MISCELLANEOUS	
VR 701	L-4
TEST POINTS	
TP301	H-3
TP302	G-3
TP303	I-2
TP701	L-4
TP751	L-1
TP752	L-1
TP753	L-1

Main 3/3 Schematic Diagram (2945LF)
/Main 3/4 Schematic Diagram (2965LF, 2970LV, 2965LV, VR-69WF)

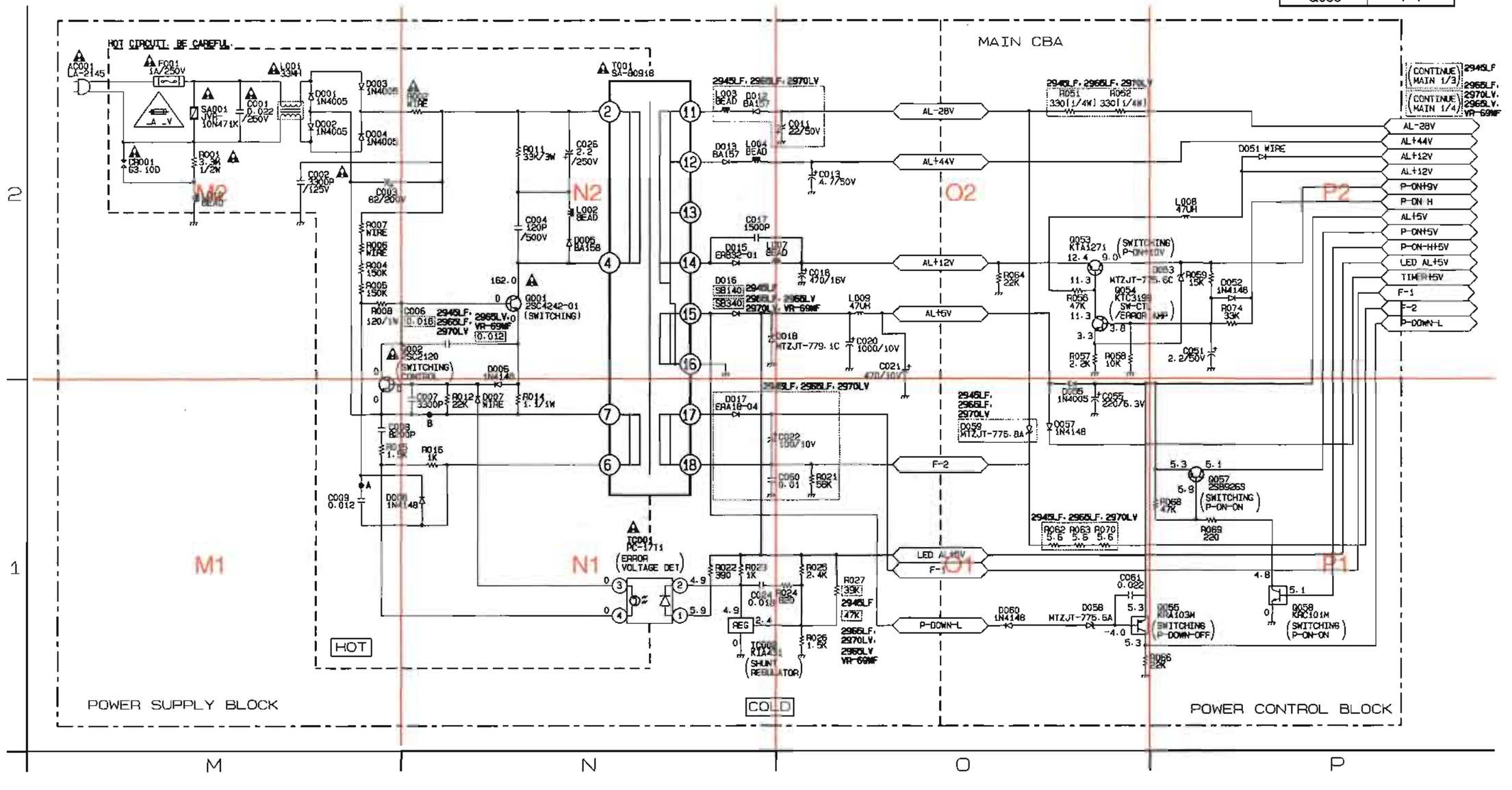
CAUTION !
Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

Main 3/3 Schematic Diagram
(2945LF)
Main 3/4 Schematic Diagram
(2965LF, 2970LV, 2965LV, VR-69WF)

REF.NO	POSITION
ICS	
IC001	N-1
IC002	N-1
TRANSISTORS	
Q001	N-2
Q002	M-1
Q053	O-2
Q054	O-2
Q055	O-1
Q057	P-1
Q058	P-1

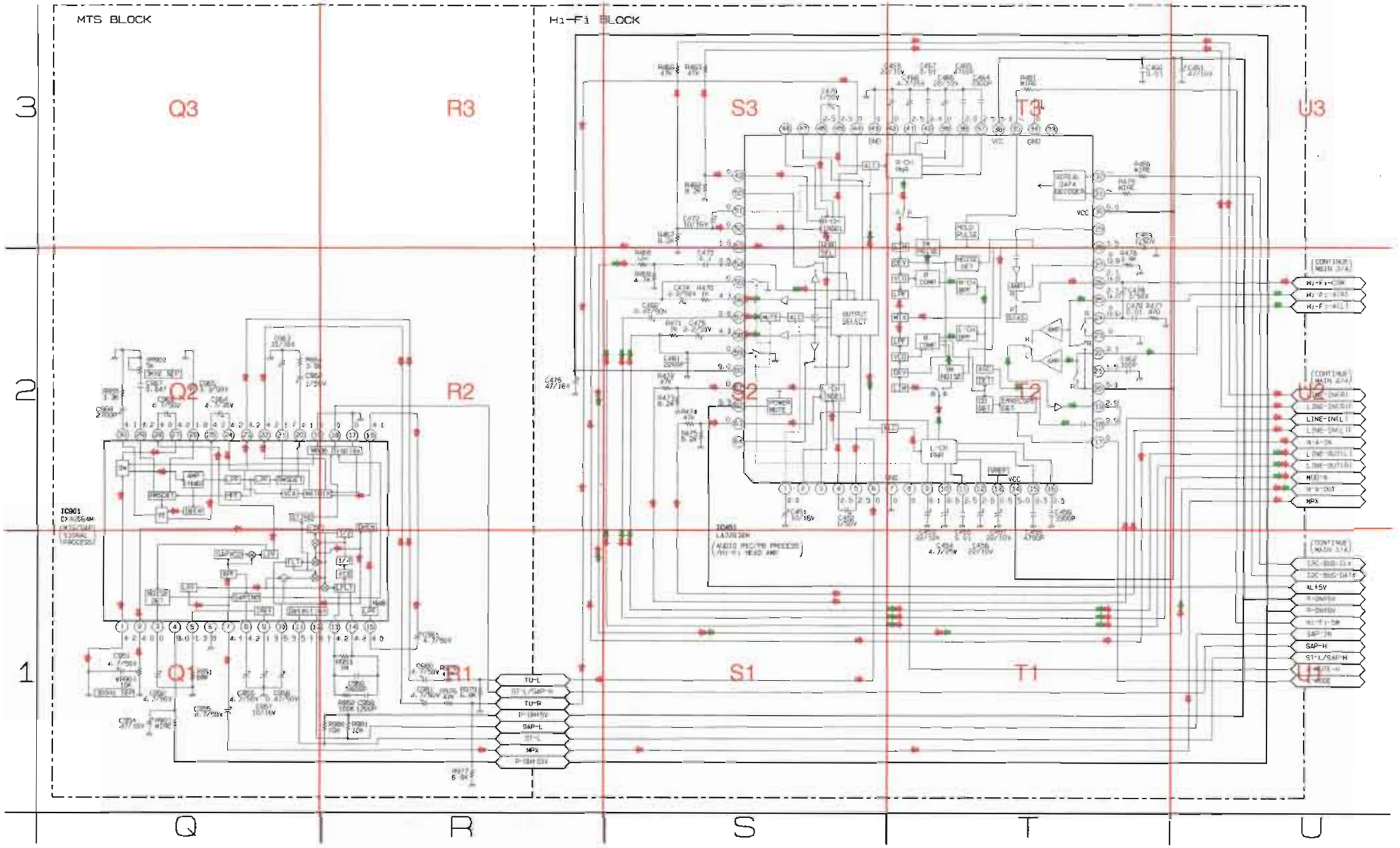


Main 4/4 Schematic Diagram (2965LF, 2970LV, 2965LV, VR-69WF)

Main 4/4 Schematic Diagram
(2965LF, 2970LV, 2965LV, VR-69WF)

REF.NO	POSITION
ICS	
IC451	S-1
IC901	Q-2
MISCELLANEOUS	
VR 901	Q-1
VR 902	Q-2

Audio(REC) Audio(PLAY)



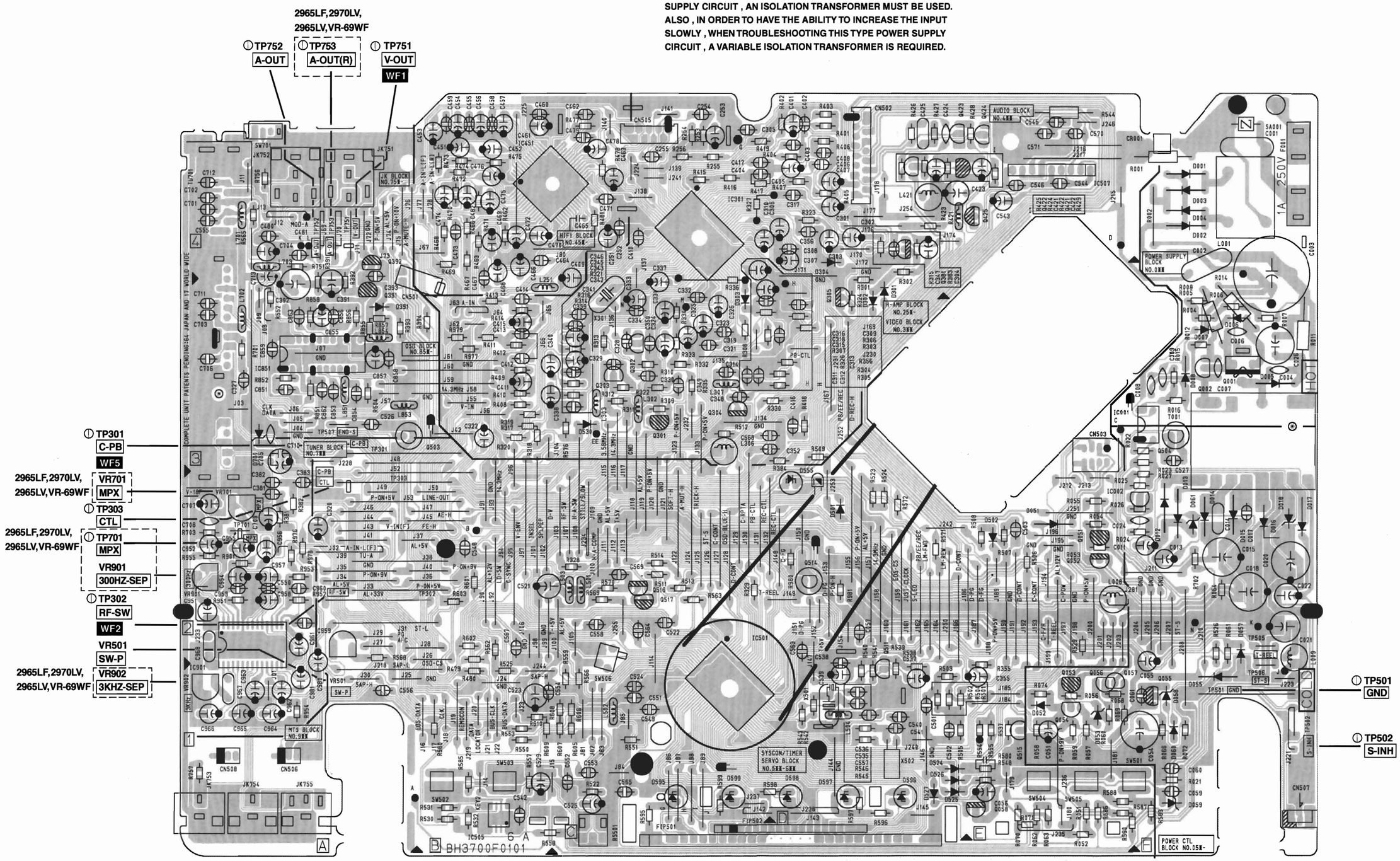
Main CBA Top View

CAUTION !
Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
This symbol means fast operating fuse.
Ce symbole représente un fusible à fusion rapide.

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED. ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.



H3884/804/65/66/H10D 02 F/R

Main CBA Bottom View

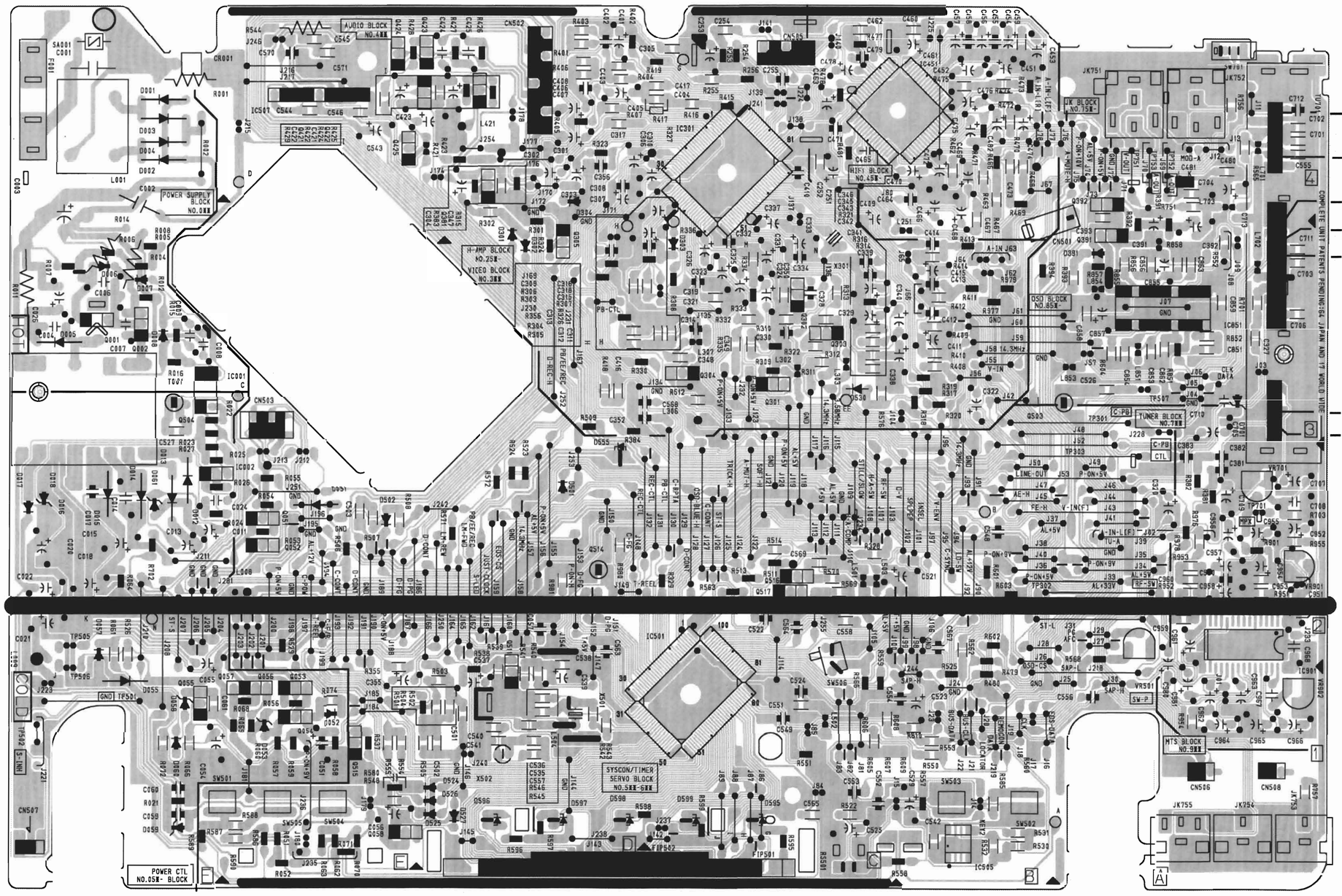
CAUTION !
Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.

F
__A __V
__A __V

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES
D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
This symbol means fast operating fuse.
Ce symbole représente un fusible à fusion rapide.

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

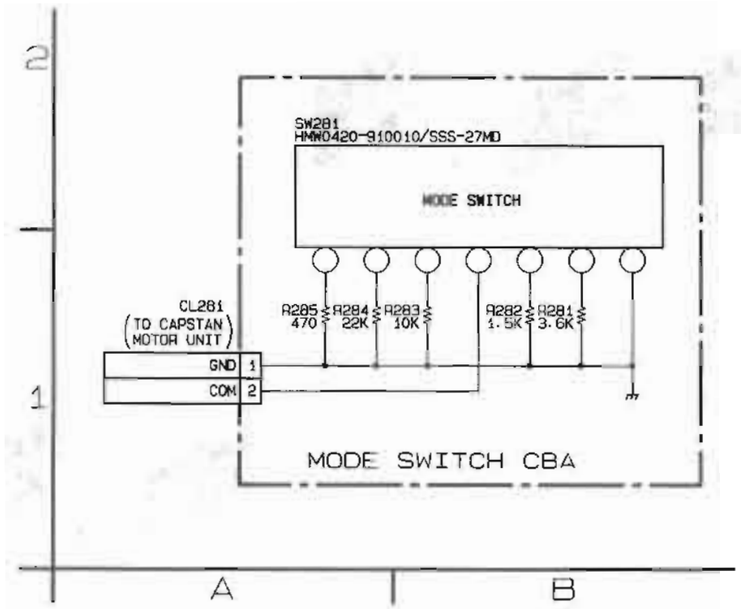
BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED. ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.



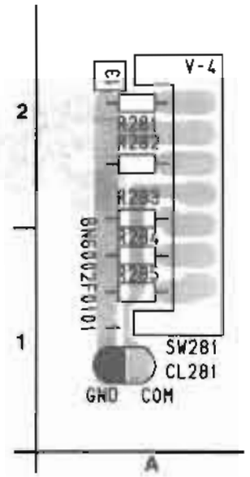
Main CBA

REF.NO	POSITION
ICS	
IC001	E-3
IC002	E-2
IC301	C-4
IC451	C-4
IC501	C-2
IC507	E-4
IC901	A-1
IC851	A-3
TRANSISTORS	
Q001	F-3
Q002	F-3
Q053	E-1
Q054	E-1
Q055	F-1
Q057	E-1
Q058	E-1
Q301	C-3
Q302	C-3
Q303	C-3
Q304	C-3
Q305	D-3
Q391	A-3
Q392	D-4
Q421	D-4
Q422	D-4
Q423	E-4
Q424	E-4
Q425	B-3
Q503	F-3
Q504	D-2
Q511	D-2
Q514	E-1
Q515	E-1
CONNECTORS	
CN501	A-3
CN502	D-4
CN503	E-3
CN505	C-4
CN507	F-1
MISCELLANEOUS	
VR 501	A-1
VR 701	A-2
VR 901	A-2
VR 902	A-1
TEST POINTS	
TP301	A-3
TP302	A-2
TP303	A-2
TP501	F-1
TP502	F-1
TP505	F-2
TP506	F-2
TP507	A-3
TP701	A-2
TP751	A-4
TP752	A-4
TP753	A-4

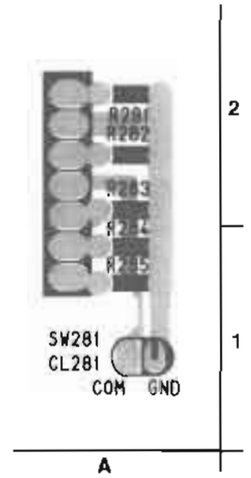
Mode SW Schematic Diagram



Mode SW CBA Top View



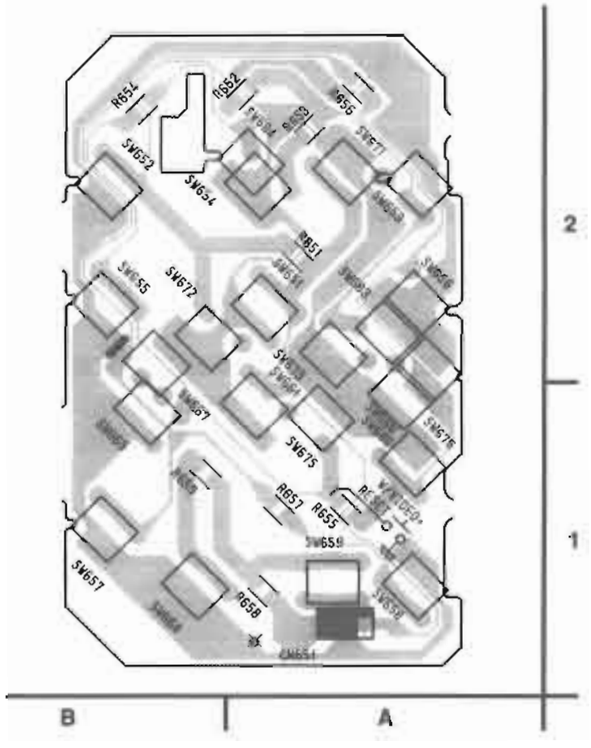
Mode SW CBA Bottom View



BN6002F01011

Function CBA Top VieW

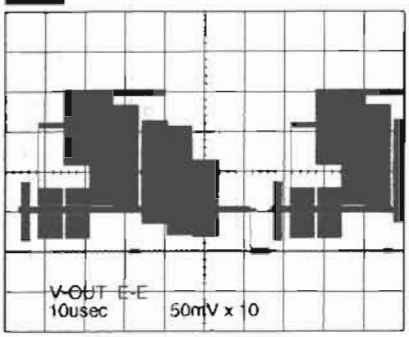
Function CBA Bottom View



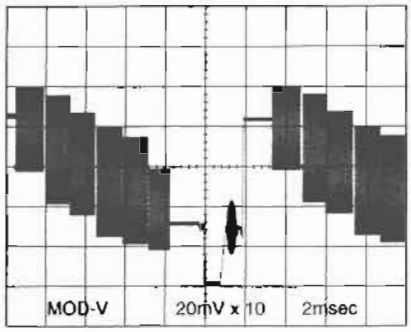
BH3700F01016-B

WAVEFORMS

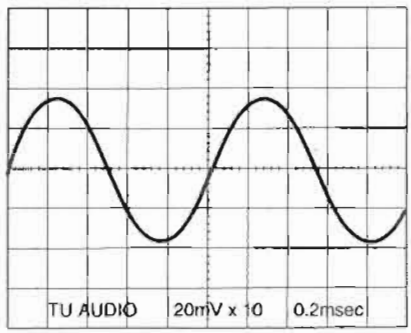
WF 1



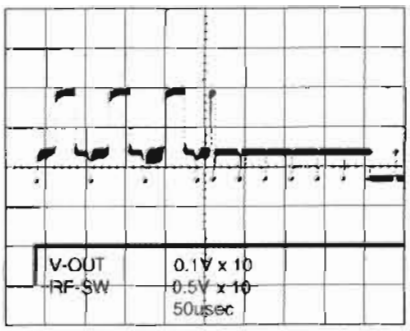
WF9



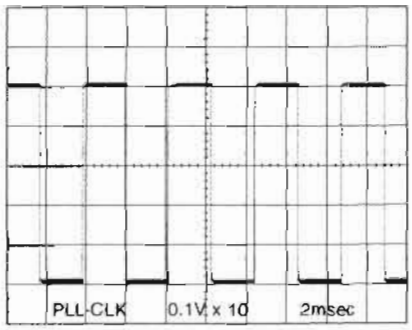
WF13



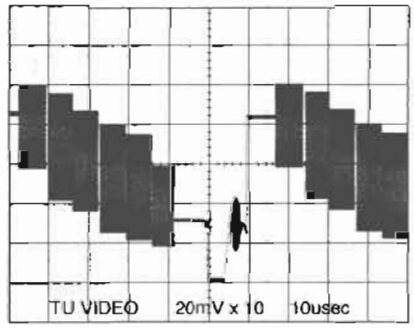
WF1 UPPER **WF2** LOWER



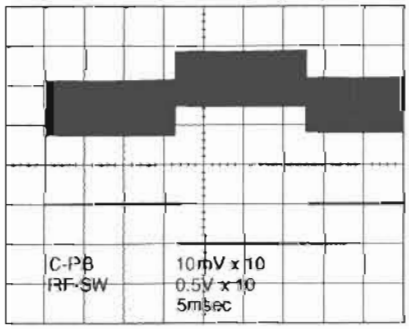
WF10



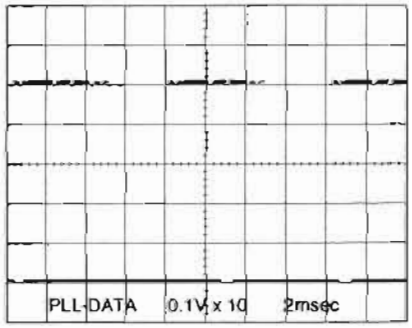
WF14



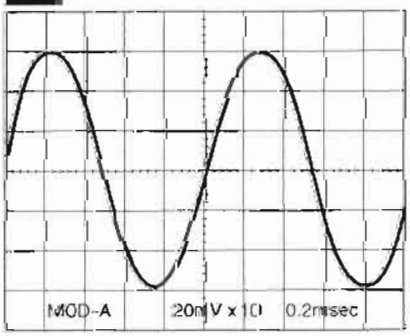
WF5



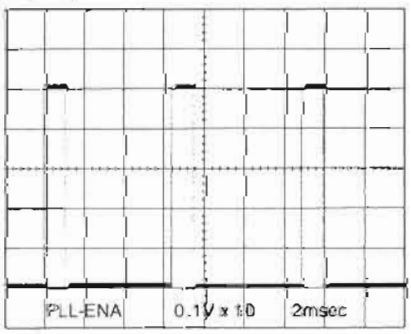
WF11



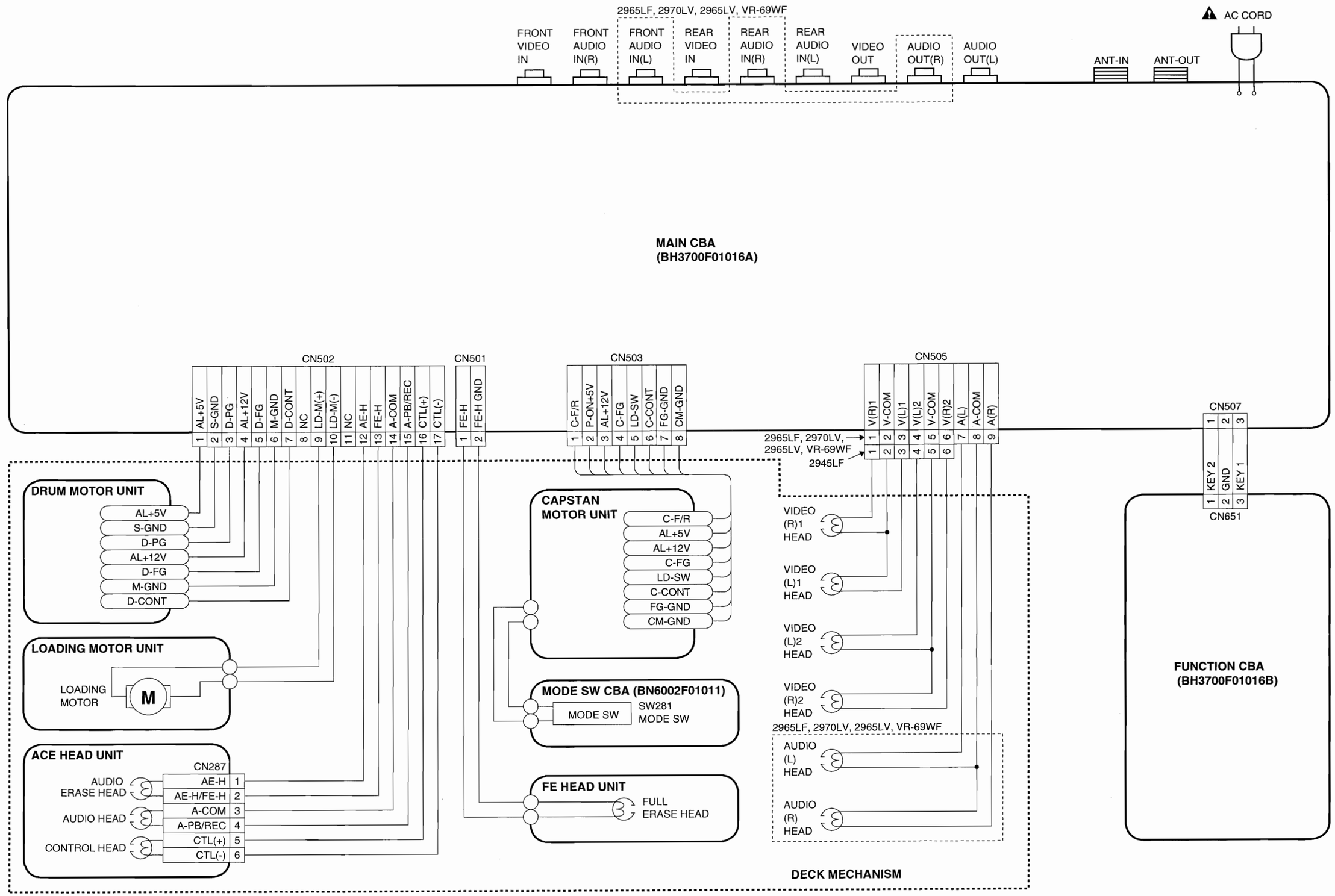
WF8



WF12



WIRING DIAGRAM



SYSTEM CONTROL TIMING CHARTS

Mode SW : LD-SW

LD-SW Position detection A/D Input voltage Limit (Calculated voltage)	Symbol
3.76V~4.50V (4.12V)	EJ
4.51V~5.00V (5.00V)	CL
0.00V~0.25V (0.00V)	SB
1.06V~1.50V (1.21V)	TL
0.66V~1.05V (0.91V)	FB
1.99V~2.60V (2.17V)	SF
1.51V~1.98V (1.80V)	AU
3.20V~3.75V (3.40V)	AL
0.26V~0.65V (0.44V)	SS
4.51V~5.00V (5.00V)	GC
2.61V~3.19V (2.97V)	RS

Note:

EJ → RS : Loading FWD (LM-FWD "H", LM-REV "L")

RS → EJ : Loading REV (LM-FWD "L", LM-REV "H")

Stop (A) = Loading

Stop (B) = Unloading

Note :

Symbol	Loading Status
EJ	Eject
CL	Eject ~ REW Reel
SB	REW Reel ~ Stop(B)
TL	Stop(B) ~ Brake Cancel
FB	Brake Cancel ~ FF / REW
SF	FF / REW ~ Stop(A)
AU	Stop(A) ~ Play / REC
AL	Play / REC ~ Still / Slow
SS	Still / Slow ~ Capstan Reversal
GC	Capstan Reversal ~ RS (REW Search)
RS	RS (REW Search)

Still/Slow Control

Frame Advance Timing Chart

1) SP MODE

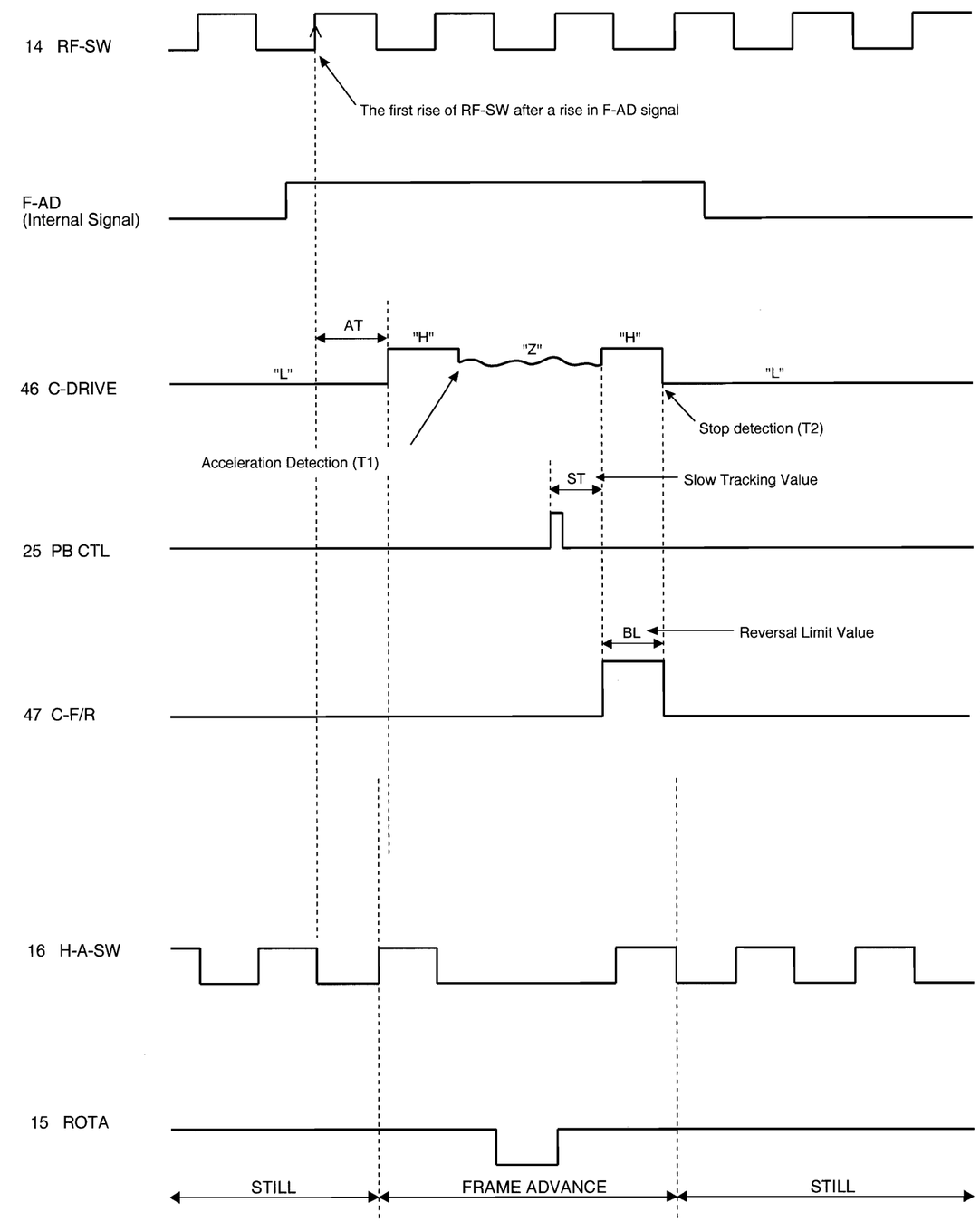


Fig.1

2) LP/SLP MODE

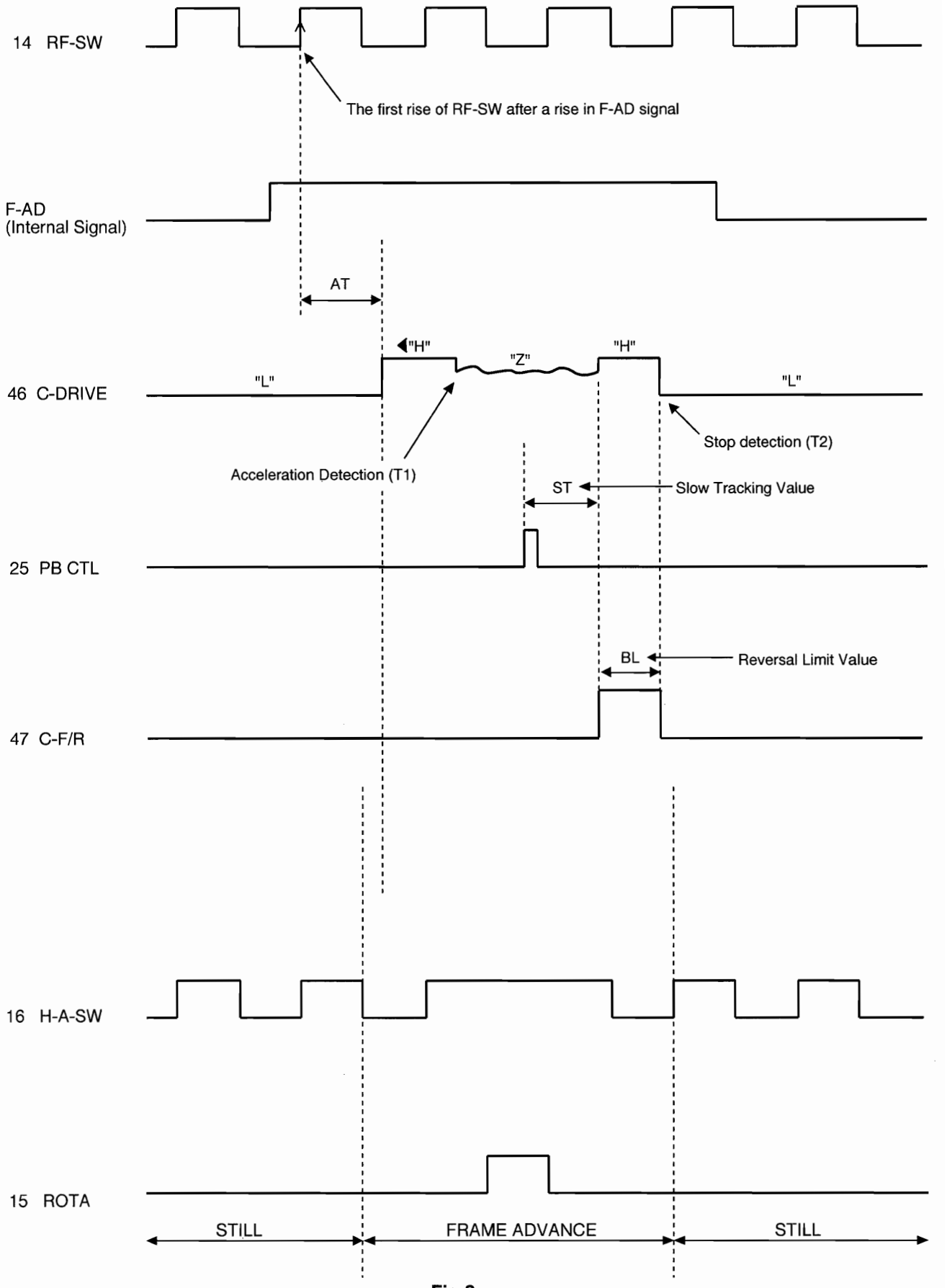


Fig.2

1. EJECT (POWER-OFF) ➜ CASSETTE IN (POWER-ON) ➜ STOP(B) ➜ STOP(A) ➜ PLAY ➜ RS ➜ FS ➜ PLAY ➜ STILL (SLOW) ➜ PLAY ➜ STOP(B)

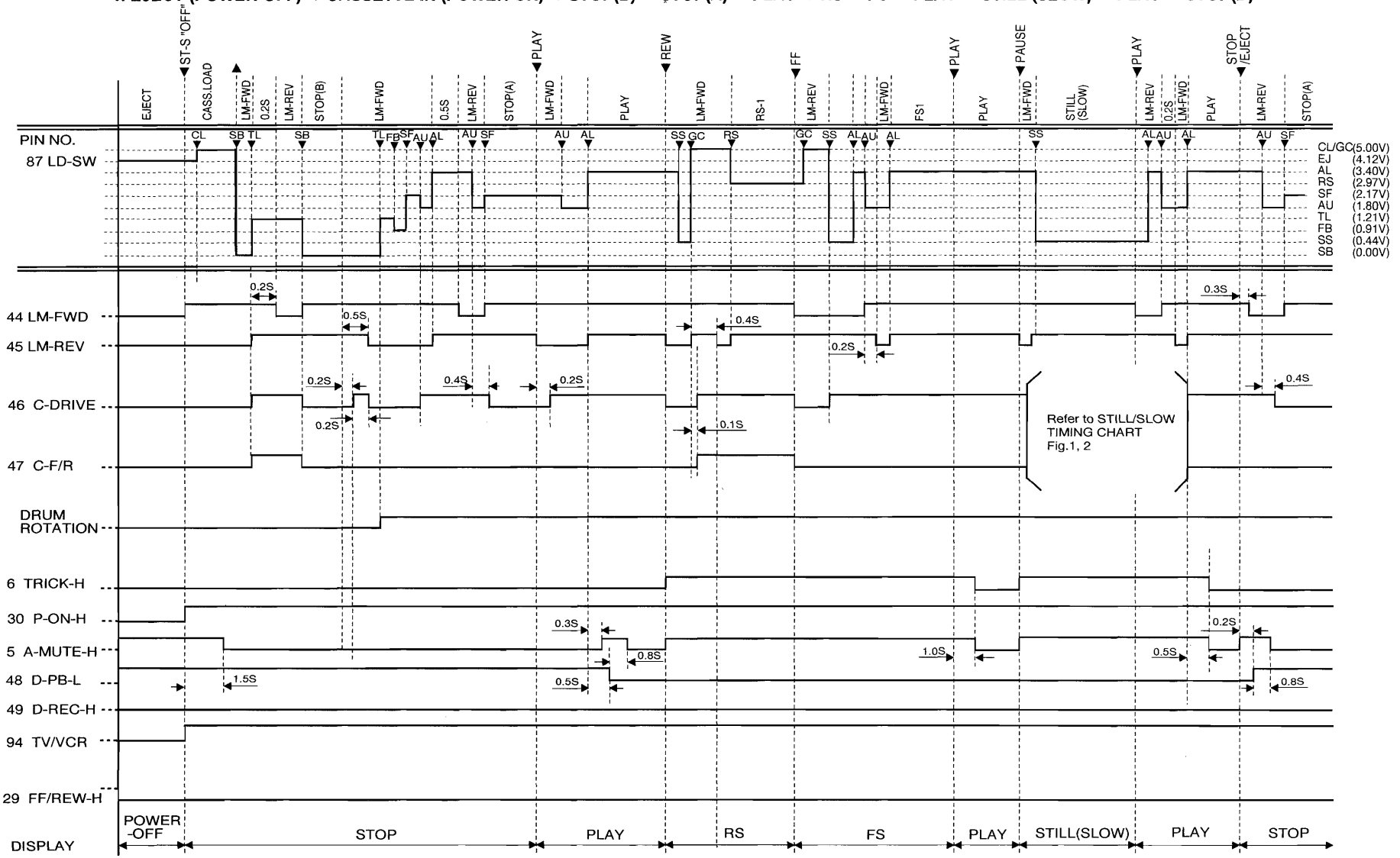


Fig.3

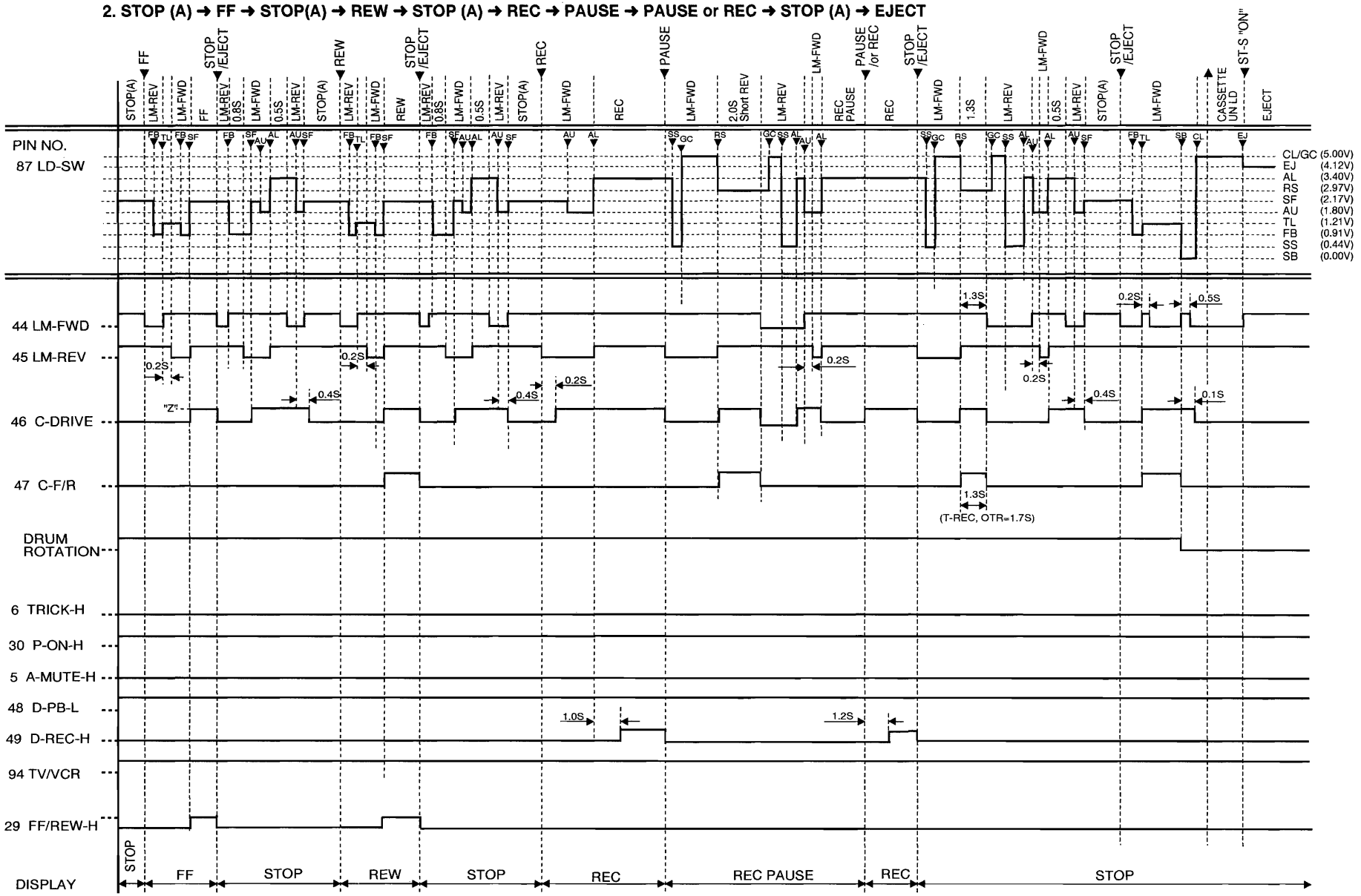

2. STOP (A) → FF → STOP(A) → REW → STOP (A) → REC → PAUSE → PAUSE or REC → STOP (A) → EJECT
PIN NO.
87 LD-SW
CL/GC (5.00V)
EJ (4.12V)
AL (3.40V)
RS (2.97V)
SF (2.17V)
AU (1.80V)
TL (1.21V)
FB (0.91V)
SS (0.44V)
SB (0.00V)
44 LM-FWD
45 LM-REV
46 C-DRIVE
47 C-F/R
DRUM ROTATION
6 TRICK-H
30 P-ON-H
5 A-MUTE-H
48 D-PB-L
49 D-REC-H
94 TV/VCR
29 FF/REW-H
DISPLAY
STOP
FF
STOP
REW
STOP
REC
REC PAUSE
REC
STOP
(T-REC, OTR=1.7S)

Fig.4

IC PIN FUNCTION

Comparison Chart of Models and Marks

Model	Mark
2945LF	A
2965LF	B
2970LV	C
2965LV	D
VR-69WF	E

IC501 (SERVO / SYSTEM CONTROL IC)

"H" ≥ 4.5V, "L" ≤ 1.0V

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
1		OUT	SP/LP/ SLP	Tape Speed SP="L"/ LP="Z" or "Hi-Z"/SLP="H" Signal	H/Z/L
2		–	N.U.	Not Used	–
3		OUT	C-CONT	Capstan Motor Control Signal	PWM
4		OUT	D-CONT	Drum Motor Control Signal	PWM
5		OUT	A-MUTE-H	Audio Mute Control Signal	H
6		OUT	TRICK-H/C-G	Special Play Back Signal (Special P.B.="H")/ Copy Guard ON/OFF Signal (ON="L" OFF="H")	H/L
7		--	N.U.	Not Used	--
8		--	N.U.	Not Used	--
9		OUT	OSD-BLUE-H	Blue Back Control Signal	H
10		OUT	D-V SYNC	Dummy Vertical Synchronized Pulse	H/Hi-Z
11		IN	REMOC-ON	Remote Control Sensor	L
12		–	N.U.	Not Used(GND)	–
13	A	–	N.U.	Not Used	–
	B,C,D, E	OUT	Hi-Fi-SW	Hi-Fi Audio Head Switching Pulse	H/L
14		OUT	RF-SW	Video Head Switching Pulse	H/L
15		OUT	ROTA	Color Phase Rotary Changeover Signal	H/L
16		OUT	H-A-SW	Video Head Amp Switching Pulse	H/L
17		IN	H-A-COMP	Head Amp Comparator Signal	H/L
18		IN	T-REEL	Take Up Reel Rotation Signal	PULSE
19		OUT	REC-CTL(-)	Record Control Signal (-)	H/L
20		OUT	REC-CTL(+)	Record Control Signal (+)	H/L
21		OUT	REC-CURRENT	Rec-Current Circuit (Usually and Rec Mode= Open)	Hi-Z
22		IN	C-FG	Capstan Motor Rotation Detection Pulse	PULSE
23		IN	D-PG	Drum Motor Pulse Generator	PULSE
24		IN	D-FG	Drum Motor Rotation Detection Pulse	PULSE
25		IN	PB-CTL	Playback Control Signal	PULSE
26		–	Vcc	Vcc (Timer +5v)	–

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
27		OUT	SOFT-H	Rental Position Mode Switching Signal (Rental Position="H"/ Usually="L")	H
28		OUT	OSD-CS	OSD IC Chip Select	L
29		–	N.U.	Not Used	–
30		OUT	P-ON-H	Power On Signal to High	H
31	A	–	N.U.	Not Used	–
	B,C,D, E	IN	ST-IN	Tuner STEREO Detect	H/L
32	A	–	N.U.	Not Used	–
	B,C,D, E	IN	SAP-IN	Tuner SAP Detect	H/L
33		IN	P-DOWN-L	Power Voltage Down Detector Signal	L
34	A	–	N.U.	Not Used	–
	B,C,D, E	IN	A-MODE	HiFi Tape Detection Signal	H/L
35		–	GND	GND	–
36		–	GND	GND	–
37		IN	RESET	System Reset Signal (Reset= "L")	L
38		–	XIN	Main Clock 14.31818 MHz	–
39		–	Xout	Main Clock	–
40		IN	CLKSEL	Clock Select (GND)	L
41		–	Vss	Vss(GND)	–
42		–	XC IN	Sub Clock 32 kHz	–
43		–	XC OUT	Sub Clock 32 kHz	–
44		OUT	LM-FWD	Loading Motor Forward Control (Forward/ Stop="H")	H

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
45		OUT	LM-REV	Loading Motor Reverse Control (Forward/ Stop="H")	H
46		OUT	C-DRIVE	Capstan Motor Drive Signal	H/Hi-Z
47		OUT	C-F/R	Capstan Motor FWD/REV Control Signal (FWD="L"/ REV="H")	H/L
48		OUT	D-PB-L	Delayed Play Back Control Signal (PB= "L")	L
49		OUT	D-REC-H	Delayed Record Signal	H
50		OUT	S-LED	LED for Sensor ON/OFF	H
51		–	N.U.	Not Used	–
52		–	N.U.	Not Used	–
53		–	N.U.	Not Used	–
54		OUT	P-ON-5	Power-on+5V	H
55		–	N.U.	Not Used	–
56		–	N.U.	Not Used	–
57		–	N.U.	Not Used	–
58		–	N.U.	Not Used	–
59		–	N.U.	Not Used	–
60		–	N.U.	Not Used	–
61	A,B,C	OUT	G1	Display Digit	H
	D,E	–	N.U.	Not Used	–
62	A,B,C	OUT	G2	Display Digit	H
	D,E	–	N.U.	Not Used	–
63	A,B,C	OUT	G3	Display Digit	H
	D,E	OUT	REC LED	REC Mode LED Indicator	H/L
64	A,B,C	OUT	G4	Display Digit	H
	D,E	OUT	TIMER LED	TIMER Mode LED Indicator	H/L
65	A,B,C	OUT	a	Display Segment	H
	D,E	–	N.U.	Not Used	–

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
66	A,B,C	OUT	b	Display Segment	H
	D,E	–	N.U.	Not Used	–
67	A,B,C	OUT	c	Display Segment	H
	D,E	OUT	TIMER LED	TIMER Mode LED Indicator	H/L
68	A,B,C	OUT	d	Display Segment	H
	D,E	OUT	CAS-SETTE IN LED	Cassette IN/OUT LED Indicate	H/L
69	A,B,C	OUT	f	Display Segment	H
	D,E	OUT	VCR LED	TV/VCR LED Indicate	H/L
70	A,B,C	OUT	g	Display Segment	H
	D,E	–	N.U.	Not Used	–
71	A,B,C	OUT	h	Display Segment	H
	D,E	–	N.U.	Not Used	–
72	A,B,C	OUT	i	Display Segment	H
	D,E	–	N.U.	Not Used	–
73	A,B,C	OUT	j	Display Segment	H
	D,E	OUT	VCR LED	TV/VCR LED Indicate	H/L
74	A,B,C	OUT	e	Display Segment	H
	D,E	–	N.U.	Not Used	–
75		–	VEE	-28V	–
76		–	Vcc	Vcc (Timer+5V)	–
77		OUT	PLL/ OSD-DATA	Tuner Control Signal (Data)/OSD IC Control Data	H/L
78		–	N.U.	Not Used	–
79		OUT	PLL/ OSD-CLK	Tuner Control Signal/OSD IC Clock	H/L
80		OUT	PLL-ENA	Tuner Control Signal (Enable)	H
81		–	Vcc	Vcc(Timer +5V)	–

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
82		–	VREF	A/D Converter Reference Voltage Input Signal(+5V)	–
83	A	–	N.U.	Not Used	–
	B,C,D, E	OUT	ST-L/ SAP-H	Tuner Stereo Detector Signal/Second Audio Program Control "H" Signal	H/L
84		–	N.U.	Not Used(GND)	–
85		IN	KEY IN-1	A/D Key Data Signal	A/D
86		IN	KEY IN-2	A/D Key Data Signal	A/D
87		IN	LD-SW	Deck Mode Position Detect Signal	A/D
88		IN	AFC	Automatic Frequency Control Signal	A/D
89		IN	PG-DELAY / TEST	Video Head Switching Pulse Signal Adjusted Voltage	A/D
90		IN	V-ENV	Video Envelope Signal	A/D
91		IN	END-S	Tape End Position Detect Signal	A/D
92		IN	ST-S	Tape Start Position Detect Signal	A/D
93		IN	C-SYNC	Composite Synchronized Pulse	PULSE
94		OUT	TV/VCR	RF Conv. ON/OFF Signal (TV="L"/ VCR="H")	H/L
95	A	–	N.U.	Not Used	–
	B,C,D, E	IN/ OUT	I2C BUS-DATA	I2CBUS Control Data	H/L
96	A	–	N.U.	Not Used	–
	B,C,D, E	OUT	I2C BUS-CLOCK	I2CBUS Control Clock	H/L

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
97		–	N.U.	Not Used	–
98		OUT	V-MUTE-L	Video Mute Signal	L
99		IN	REC-SAF-SW	Recording Safety SW Detect (With Record tab="L"/Without Record tab="H")	H/L
100		OUT	INSEL	Input Selector Control Signal (Rear="H"/Front="Z"/Tuner="L")	H/Hi-Z/L

Notes:

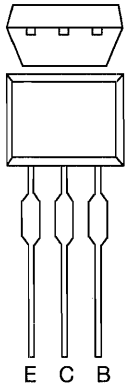
Abbreviation for Active Level:

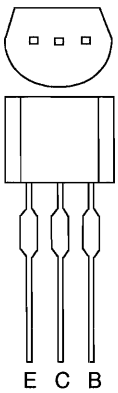
PWM ---------- Pulse Wide Modulation

A/D ---------- Analog - Digital Converter

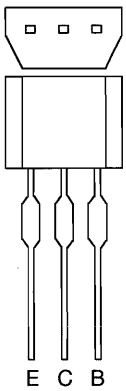
LEAD IDENTIFICATIONS

2SA1175 (J, H, F)



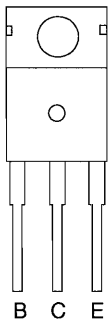


2SC3331 (T, U)
2SC2120 (Y)
2SA1015-GR (TPE2)
2SC1815-GR (TPE2)
2SC1815-Y (TPE2)
2SC1815-BL (TPE2)
KTC3203 (Y)
KTA1266 (Y, GR)



KTA1271(Y)
DTA124ES
2SC2058(Q)
2SA933(Q, R)
2SA933AS(Q, R)
2SC2785 (J, H, F, K)
2SA950 (Y)
2SA608 (E, F)
KRA103M
KRC103M
KTA1267 (Y, GR)
KTC3193 (Y)
KTC3199 (Y, GR, BL)
2SC1740(Q, R)
2SA1346
KRC101M
2SB926(S)

KSC5020 (O, R)



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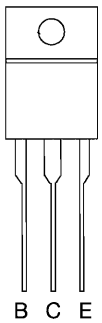

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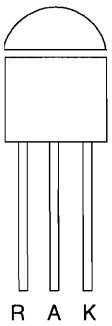

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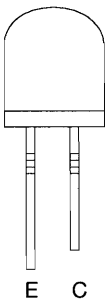

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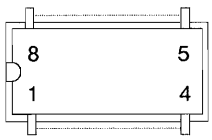
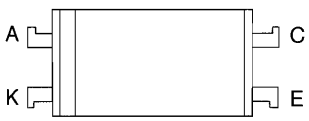
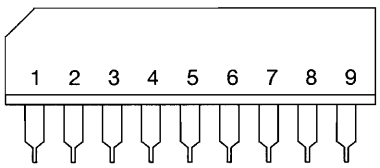
CXA2064M





PC-17T1
PS2501-1(D, H, L, M, W)
LTV-817B-F
LTV-817C-F

TA7291S



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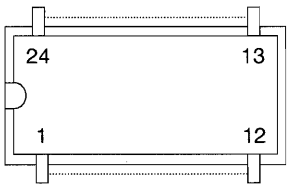
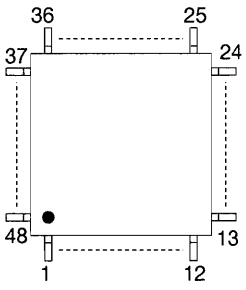
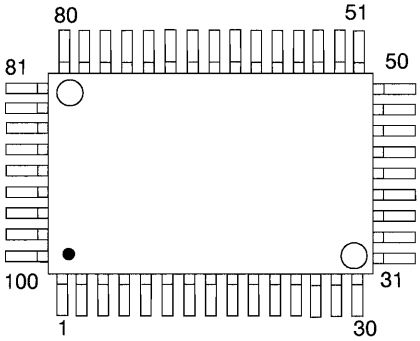


LA72638M





LA71070M
LA71073M
LA71075M
LA71077M
QSMQA0RMB224
QSMQB0RMB222

Note:
A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference

DECK MECHANISM SECTION

VIDEO CASSETTE RECORDER

2945LF/2965LF/2970LV/ 2965LV/VR-69WF

Sec. 2: Deck Mechanism Section

- **Standard Maintenance**
- **Alignment for Mechanism**
- **Disassembly/Assembly of Mechanism**
- **Front Loading Assembly**
- **Alignment Procedures of Mechanism**

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Service Fixtures and Tools 2-2-1
Mechanical Alignment Procedures 2-3-1
Disassembly / Assembly Procedures of Deck Mechanism 2-4-1
Front Loading Assembly 2-4-8
Alignment Procedures of Mechanism 2-4-10

STANDARD MAINTENANCE

Service Schedule of Components

H: Hours ❍: Check ●: Change

Deck		Periodic Service Schedule			
Ref. No.	Part Name	1,000 H	2,000 H	3,000 H	4,000 H
B2	Cylinder Assembly	❍	●	❍	●
B3	Loading Motor Assembly			●	
B8	Pulley Assembly		●		●
B21	Loading Belt		●		●
B27	Tension Lever Assembly		●		●
B31	AC Head Assembly			●	
B32, B339	Reel (T), Reel (S)			●	
B37	Capstan Motor		●		●
B52	Capstan Belt		●		●
*B73	FE Head CBA			●	
B132	Clutch Assembly		●		●
B133	Idler Assembly		●		●
B410	Pinch Roller Assembly		●		●
B413	Main Brake T Sub Assembly		●		●
B414	Main Brake S Assembly		●		●

Notes:

1. Clean all parts for the tape transport (Upper Drum with Video Head / Pinch Roller / Audio Control Head / Full Erase Head) using 90% Isopropyl Alcohol.
2. After cleaning the parts, do all DECK ADJUSTMENTS.
3. For the reference numbers listed above, refer to Deck Exploded Views.

   * B73 ------ VCR Model only

Cleaning

Cleaning of Video Head

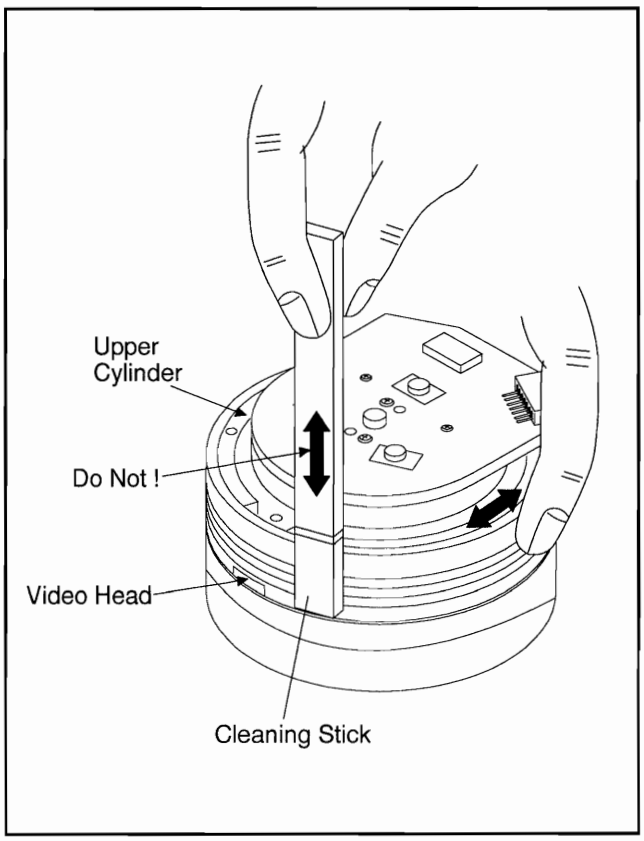
Clean the head with a head cleaning stick or chamois cloth.

Procedure

1. Remove the top cabinet.
2. Put on a glove (thin type) to avoid touching the upper and lower drum with your bare hand.
3. Put a few drops of 90% Isopropyl alcohol on the head cleaning stick or on the chamois cloth and, by slightly pressing it against the head tip, turn the upper drum to the right and to the left.

Notes:

1. The video head surface is made of very hard material, but since it is very thin, avoid cleaning it vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit.
3. Do not reuse a stained head cleaning stick or a stained chamois cloth.



Cleaning of Audio Control Head

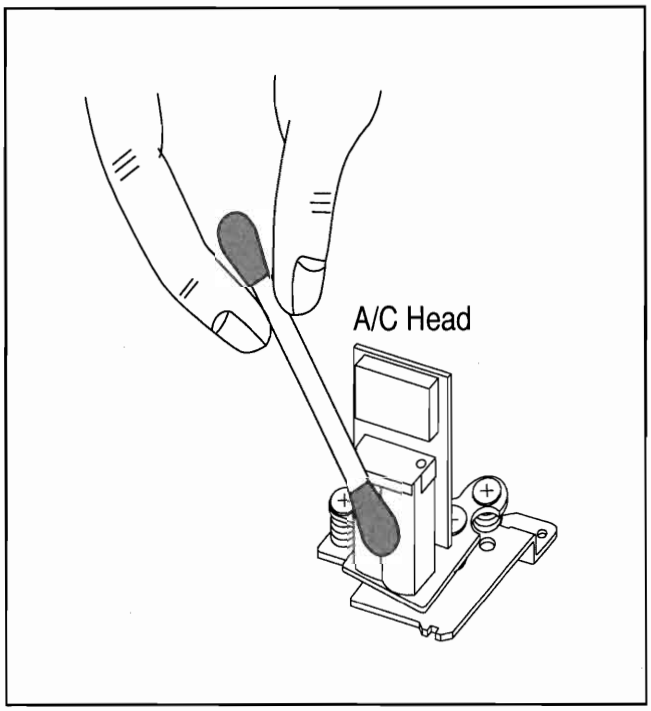
Clean the head with a cotton swab.

Procedure

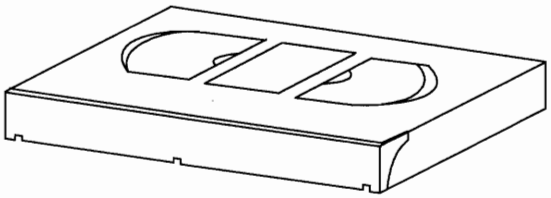
1. Remove the top cabinet.
2. Dip the cotton swab in 90% isopropyl alcohol and clean the audio control head. Be careful not to damage the upper drum and other tape running parts.

Notes:

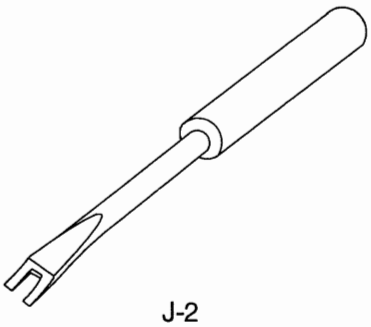
1. Avoid cleaning the audio control head vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit or damage may occur.



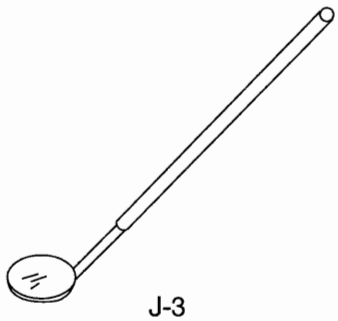
SERVICE FIXTURE AND TOOLS



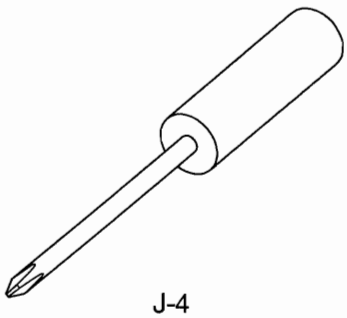
J-1-1, J-1-2



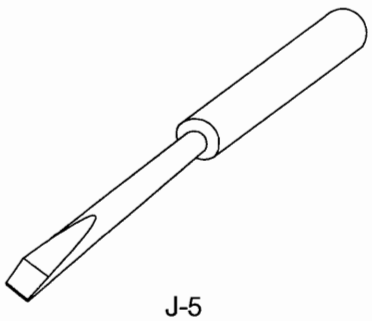
J-2



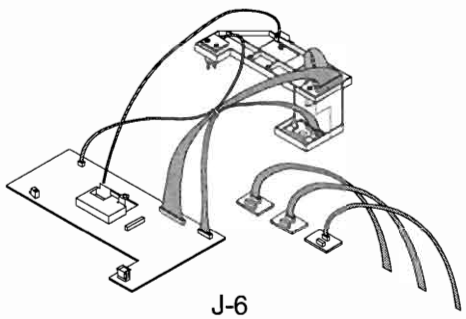
J-3



J-4



J-5



J-6

Ref. No.	Name	Part No.	Adjustment
J-1-1	Alignment Tape	FL8A	Head Adjustment of Audio Control Head
J-1-2	Alignment Tape	FL8N (2Head only) FL8NW (4Head only)	Azimuth and X Value Adjustment of Audio Control Head / Adjustment of Envelope Waveform
J-2	Guide Roller Adj.Screwdriver	FSJ-0006	Guide Roller
J-3	Mirror	FSJ-0004	Tape Transportation Check
J-4	Azimuth Adj.Screwdriver +	Available Locally	A/C Head Height
J-5	X Value Adj.Screwdriver -	Available Locally	X Value
J-6	U19 Deck Extension Cable	N1200XA	All Mechanical and Electrical Adjustments

Note:
Before starting any adjustment, take the Deck Assembly out of the cabinet and use J-6 to connect the Deck Assembly with the Main CBA.

MECHANICAL ALIGNMENT PROCEDURES

Explanation of alignment for the tape to correctly run starts on the next page. Refer to the information below on this page if a tape gets stuck, for example, in the mechanism due to some electrical trouble of the unit.

Service Information

A. Method for Manual Tape Loading/Unloading

To load a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Cover.
3. Insert a cassette tape. Though the tape will not be automatically loaded, make sure that the cassette tape is all the way in at the inlet of the Cassette Holder. To confirm this, lightly push the cassette tape further in and see if the tape comes back out, by a spring motion, just as much as you have pushed in.
4. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1 until the cassette tape is fully loaded. By turning the Pulley Assembly, you are turning the cam indicated in this figure. However, movement of the cam will be very slow. Allow a minute or two to complete this task.

To unload a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Cover.
3. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1 to unload the cassette tape. When turning the Pulley Assembly, please be aware that this is a long process and the cassette will not start getting unloaded instantaneously. Within this long process, before the cassette actually starts getting unloaded, there is a time period during which the moving guide assemblies slide back to their original positions shown in Fig. M1. However, the tape will be left wound around the cylinder. To put the tape back into the cassette, gently turn the Capstan Motor in the direction shown in Fig. M2. Make sure that the tape is completely placed back in the cassette before the cassette starts getting unloaded. Otherwise the tape hanging out will be caught and damaged by the lid of the cassette when it closes.
   By turning the Pulley Assembly, you are turning the cam indicated in Fig. M1. As stated, movement of the cam will be very slow. Allow a minute or two to complete this task.

B. Method to place the Cassette Holder in the tape-loaded position without a cassette tape

1. Disconnect the AC Plug.
2. Remove the Top Cover.
3. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1. Release the locking tabs shown in Fig. M1 and continue turning the Pulley Assembly until the Cassette Holder comes to the tape-loaded position. Allow a minute or two to complete this task.

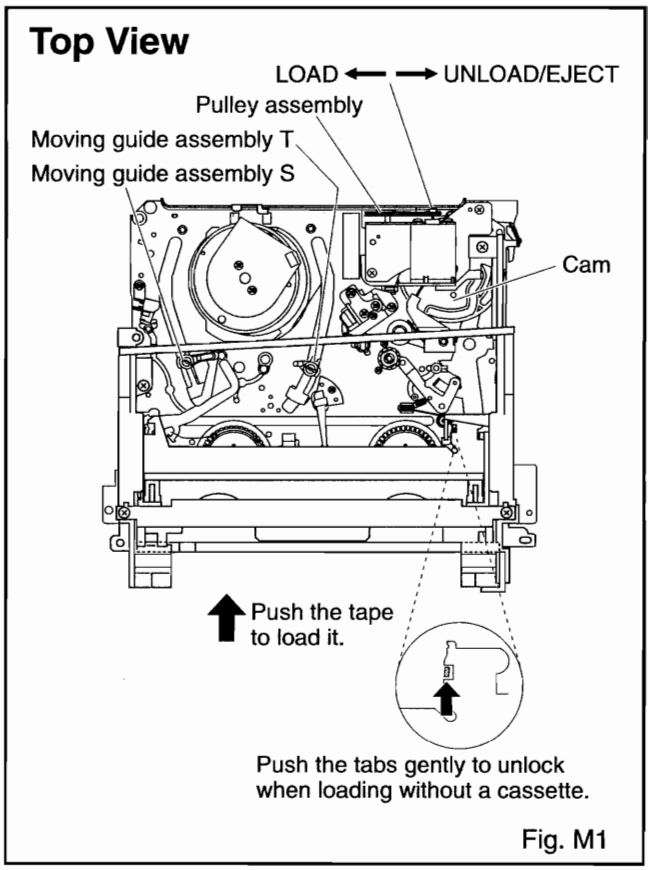


Fig. M1

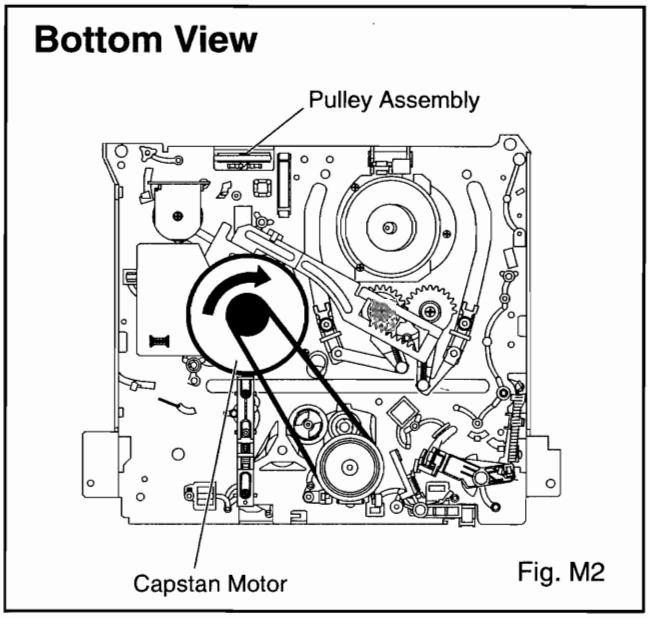


Fig. M2

1. Tape Interchangeability Alignment

Notes:

1. To do these alignment procedures, make sure that the Tracking Control Circuit is set to the center position every time a tape is loaded or unloaded. (Refer to page 2-3-4, procedure 1-C, step 2.)

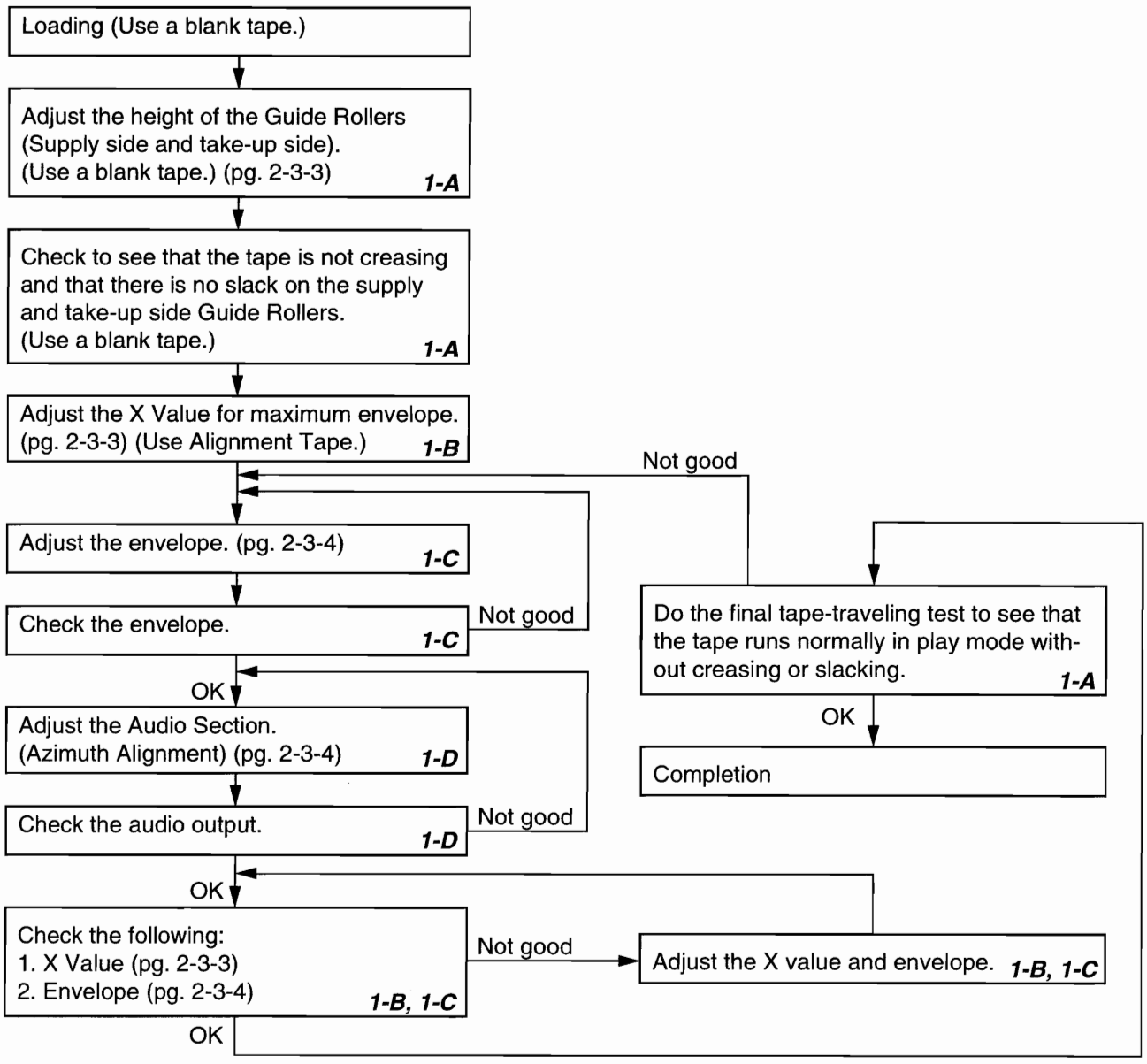
2. Remove the Guide Holder R before begining alignment procedures.
(Refer to page 2-4-9. Fig: DM22).

Equipment required:

Dual Trace Oscilloscope
VHS Alignment Tape (FL8NW)
Guide Roller Adj. Screwdriver
X-Value Adj. Screwdriver

Note: Before starting this Mechanical Alignment, do all Electrical Adjustment procedures.

Flowchart of Alignment for tape traveling


Loading (Use a blank tape.)
Adjust the height of the Guide Rollers (Supply side and take-up side). (Use a blank tape.) (pg. 2-3-3) 1-A
Check to see that the tape is not creasing and that there is no slack on the supply and take-up side Guide Rollers. (Use a blank tape.) 1-A
Adjust the X Value for maximum envelope. (pg. 2-3-3) (Use Alignment Tape.) 1-B
Not good
Adjust the envelope. (pg. 2-3-4) 1-C
Check the envelope. 1-C
Not good
OK
Adjust the Audio Section. (Azimuth Alignment) (pg. 2-3-4) 1-D
Check the audio output. 1-D
Not good
OK
Check the following:
1. X Value (pg. 2-3-3)
2. Envelope (pg. 2-3-4) 1-B, 1-C
Not good
Adjust the X value and envelope. 1-B, 1-C
OK
Do the final tape-traveling test to see that the tape runs normally in play mode without creasing or slacking. 1-A
OK
Completion

1-A. Preliminary/Final Checking and Alignment of Tape Path

Purpose:

To make sure that the tape path is well stabilized.

Symptom of Misalignment:

If the tape path is unstable, the tape will be damaged.

Note: Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

1. Play back a blank cassette tape and check to see that the tape runs without creasing at Guide Rollers [2] and [3], and at points A and B on the lead surface. (Refer to Fig M3 and M4.)
2. If creasing is apparent, align the height of the guide rollers by turning the top of Guide Rollers [2] and [3] with a Guide Roller Adj. Screwdriver. (Refer to Fig. M3 and M5.)
   Note: Beneath each Guide Roller, there is a small screw. (Refer to Fig. M5.) This screw works to apply adequate torque to the shaft of each Guide Roller so that the Guide Roller turns properly. Even when adjusting the height of the Guide Roller(s), do not touch these two small screws.
3. Check to see that the tape runs without creasing at Take-up Guide Post [4] or without snaking between Guide Roller [3] and ACE Head. (Fig. M3 and M5)
4. If creasing or snaking is apparent, adjust the Tilt Adj. Screw of the ACE Head. (Fig. M6)

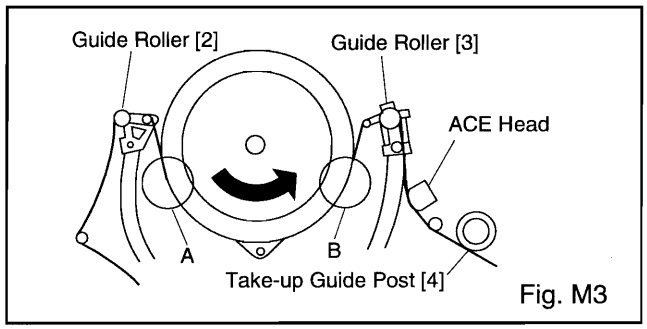


Fig. M3

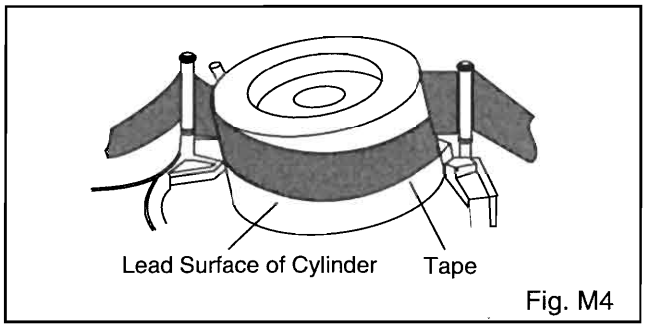


Fig. M4

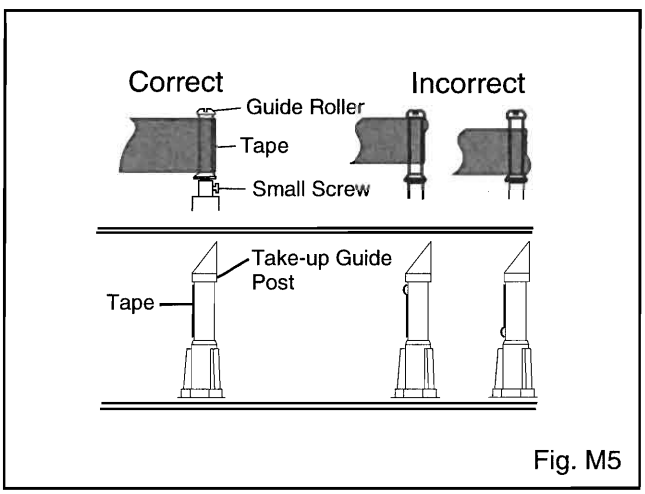


Fig. M5

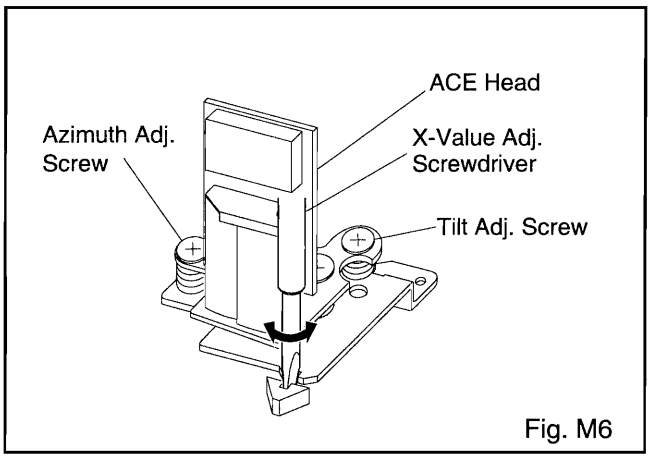


Fig. M6

1-B. X Value Alignment

Purpose:

To align the horizontal position of the Audio/Control/Erase Head.

Symptom of Misalignment:

If the horizontal position of the Audio/Control/Erase Head is not properly aligned, maximum envelope cannot be obtained at the Neutral position of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) and TP303 (CTL) on the Main CBA. Use TP302 (RF-SW) as a trigger.
2. Play back the Gray Scale of the Alignment Tape (FL8NW) and confirm that the PB FM signal is present.
3. Set the Tracking Control Circuit to the center position by pressing the CH UP button then the PLAY button on the VCR. (Refer to note on bottom of page 2-3-4.)
4. Use the X-Value Adj. Screwdriver so that the PB FM signal at TP301 (C-PB) is maximum. (Fig. M6)
5. Press the CH UP button on VCR until the CTL waveform has shifted by approx. +2msec. Make sure that the envelope is simply attenuated (shrinks in height) during this process so that you will know the envelope has been at its peak.

6. Press the CH DOWN button on the VCR until the CTL waveform has shifted from its original position (not the position achieved in step 5, but the position of CTL waveform in step 4) by approximately -2msec. Make sure that the envelope is simply attenuated (shrinks in height) once CTL waveform passes its original position and is further brought in the minus direction.
7. Set the Tracking Control Circuit to the center position by pressing the CH UP button and then the PLAY button on the VCR.

1-C. Checking/Adjustment of Envelope Waveform

Purpose:

To achieve a satisfactory picture and precise tracking.

Symptom of Misalignment:

If the envelope output is poor, noise will appear in the picture. The tracking will then lose precision and the playback picture will be distorted by any slight variation of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) on the Main CBA. Use TP302 (RF-SW) as a trigger.
2. Play back the Gray Scale on the Alignment Tape (FL8NW). Set the Tracking Control Circuit to the center position by pressing the CH UP and then the PLAY button on the VCR. Adjust the height of Guide Rollers [2] and [3] (Fig. M3, Page 2-3-3) watching the oscilloscope display so that the envelope becomes as flat as possible. To do this adjustment, turn the top of the Guide Roller with the Guide Roller Adj. Screwdriver.
3. If the envelope is as shown in Fig. M7, adjust the height of Guide Roller [2] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
4. If the envelope is as shown in Fig. M8, adjust the height of Guide Roller [3] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
5. When Guide Rollers [2] and [3] (Refer to Fig. M3) are aligned properly, there is no envelope drop either at the beginning or end of track as shown in Fig. M9.

Note: Upon completion of the adjustment of Guide Rollers [2] and [3] (Refer to Fig. M3), check the X Value by pushing the CH UP or DOWN buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure center position. The number of pushes UP to achieve 1/2 level of envelope should match the number of pushes DOWN from center. If required, redo the "X Value Alignment."

1-D. Azimuth Alignment of Audio/Control/ Erase Head

Purpose:

To correct the Azimuth alignment so that the Audio/Control/Erase Head meets tape tracks properly.

Symptom of Misalignment:

If the position of the Audio/Control/Erase Head is not properly aligned, the Audio S/N Ratio or Frequency Response will be poor.

1. Connect the oscilloscope to the audio output jack on the rear side of the deck.
2. Play back the alignment tape (FL8NW) and confirm that the audio signal output level is 8 kHz.
3. Adjust Azimuth Adj. Screw so that the output level on the AC Voltmeter or the waveform on the oscilloscope is at maximum. (Fig. M6)

Dropping envelope level at the beginning of track.

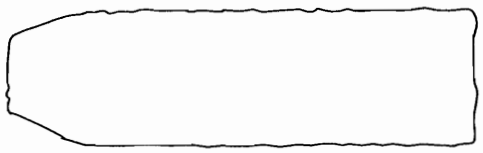


Fig. M7

Dropping envelope level at the end of track.

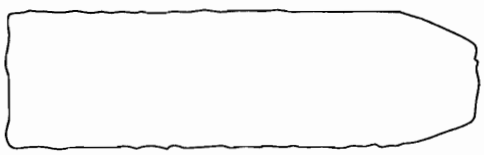


Fig. M8

Envelope is adjusted properly. (No envelope drop)

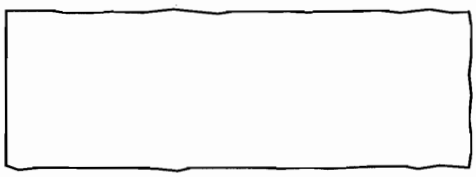


Fig. M9

DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM

Main Mechanism

Before following the procedures described below, be sure to:

1. Remove the deck assembly from the cabinet.
   (Refer to CABINET DISASSEMBLY INSTRUCTIONS on page 1-6-1.)
2. Remove Front Loading Assembly from the main mechanism of the deck assembly. (See Fig. DM1.)
3. First remove Step/Loc. No. [39], and start to remove other parts. (See Fig. DM1.)
4. Before Step/Loc. No. [2] and [9] first remove ACH Connector A, ACH Connector B, VH Connector A, and VH Connector B. (See Fig. DM2.)

All the following procedures, including those for adjustment and replacement of parts, should be done in Eject mode; see the positions of [37] and [38] in Fig. DM3 on page 2-4-4. When reassembling, follow the steps in reverse order.

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Cylinder Shield	T	DM1	(S-2), (S-14)	
[2]	[2]	Loading Motor Assembly	T	DM2 DM3 DM5 DM6	(S-3), Loading Belt ACH Connectors A and B, FFC Cable	
[3]	[2]	Motor Holder	T	DM1 DM3 DM5	2(S-4)	
[4]	[2]	Cassette Drive Lever Sub Assembly	T	DM3 DM5		(+) Refer to Alignment Sec. Pg. 2-4-10
[5]	[2]	Pinch Roller Assembly	T	DM3 DM5	(C-1)	Refer to Alignment Sec. Pg. 2-4-10
[6]	[6]	Mode SW CBA	B	DM4 DM5	(S-5), Desolder	
[7]	[2]	Cam	T	DM3 DM5		(+) Refer to Alignment Sec. Pg. 2-4-10
[8]	[2]	Pulley Assembly	T	DM3 DM6	(W-1), Loading Belt	(+)
[9]	[9]	Cylinder Assembly	T B	DM2 DM3 DM7	3(S-6), *VH Connectors A and B, FFC Cable	
[10]	[10]	FE Head	T	DM3 DM7	(S-7)	
[11]	[11]	ACE Head Assembly	T	DM2 DM3 DM8	(S-8), (S-16), FFC Cable	
[12]	[12]	Tape Guide Arm Assembly	T	DM3 DM8	*(P-0), *(L-1)	
[13]	[12]	Capstan Motor	B T	DM4 DM5 DM9 DM16	4(S-9), Capstan Belt, Radiator Plate, Desolder	
[14]	[14]	M Brake S Assembly	T	DM3 DM10	*(L-4)	
[15]	[15]	Tension Lever Assembly	T	DM3 DM10	*(L-2), *(L-3), *(P-1), *(P-2)	
[16]	[16]	Rec Arm	B	DM4 DM11	*(L-5)	
[17]	[17]	BT Arm	B	DM4 DM10 DM11	*(L-6), *(P-2)	
[18]	[17]	Holder Kick Arm	B	DM4 DM11	*(P-3)	
[19]	[17]	Tension Plate	B	DM4 DM11		
[20]	[17]	Mode Lever	T	DM3 DM12	*4(L-7), *(L-8), *Locking Tab	

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[21]	[17]	Idler Assembly	T	DM3 DM13	(C-4)	
[22]	[15]	S Brake Lever	T	DM3 DM14	*(P-4), *(L-10)	
[23]	[17]	M Brake T sub Assembly	T	DM3 DM13	*(P-5), *(L-11)	
[24]	[15]	Reel S	T	DM3 DM14	Poly Slider Washer	(+) Base has slots.
[25]	[17]	Reel T	T	DM3 DM14	Poly Slider Washer	(+)
[26]	[26]	M Gear	T	DM3 DM14	(C-5)	
[27]	[2]	Main Lever Assembly	T	DM3 DM15		
[28]	[2]	M Lever Holder	T	DM3 DM15	*2(L-12)	
[29]	[29]	Clutch Assembly	B	DM4 DM16	(C-2), Capstan Belt, Poly Slider Washer	(+)
[30]	[29]	FF Arm	B	DM4 DM16	*2(L-13)	
[31]	[31]	Sensor Gear	B	DM4 DM17	(C-3)	
[32]	[32]	Main Lever Spring	T	DM3 DM8		
[33]	[33]	Prism	T	DM3 DM13	(S-10)	
[34]	[12]	Loading Lever Assembly	B	DM4 DM18	(S-11)	(+) Refer to Alignment Sec. Pg. 2-4-10
[35]	[34]	Loading Arm T Assembly	B	DM4 DM18		(+) Refer to Alignment Sec. Pg. 2-4-10
[36]	[34]	Loading Arm S Assembly	B	DM4 DM18	(S-15)	(+) Refer to Alignment Sec. Pg. 2-4-10
[37]	[2]	Moving Guide S Preparation	T	DM3 DM19		
[38]	[2]	Moving Guide T Preparation	T	DM3 DM19		
[39]	[39]	Deck Earth Plate	T	DM1 DM3	(S-12)	
[40]	[40]	Cleaner Assembly	T	DM3 DM7	*(L-14)	
[41]	[41]	Insulation Cover	T	DM3 DM13	*3(L-15)	
[42]	[42]	F Brake Assembly	B	DM4 DM9	2(S-13), *(P-6)	
[43]	[43]	Prism (L2)	T	DM3 DM8	(S-17)	
↓ ①	↓ ②	↓ ③	↓ ④	↓ ⑤	↓ ⑥	↓ ⑦

①: Follow steps in sequence. When reassembling, follow the steps in reverse order.
These numbers are also used as Identification (location) No. of parts in the figures.

②: Indicates the part to start disassembling with in order to disassemble the part in column (1).

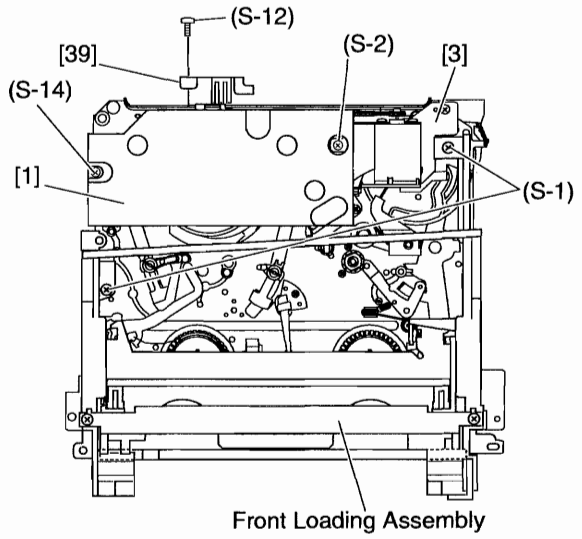
③: Name of the part

④: Location of the part: T=Top B=Bottom R=Right L=Left

⑤: Figure Number

⑥: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder
e.g., 2(L-2) = two Locking Tabs (L-2).

⑦: Adjustment Information for Installation
(+): Refer to Deck Exploded Views for lubrication.



Note: Remove the Front Loading Assembly before removing [3] Motor Holder.

To remove Front Loading Assembly:
1. Remove 2 Screws; 2(S-1).
2. Lift Assembly up carefully.

Fig. DM1

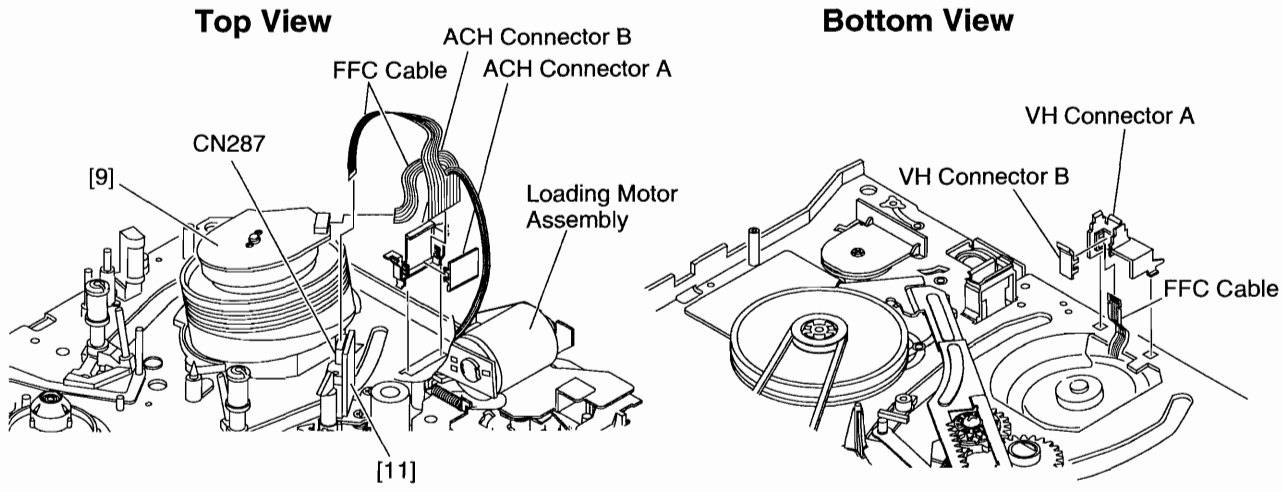


Fig. DM2

Top View

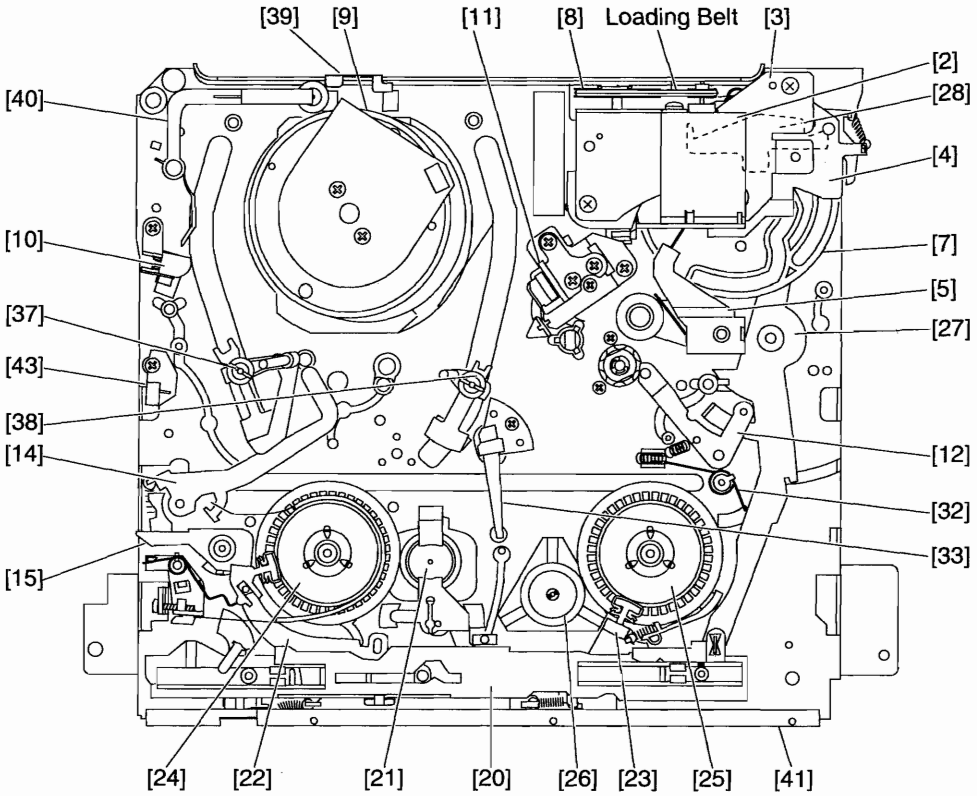


Fig. DM3

Bottom View

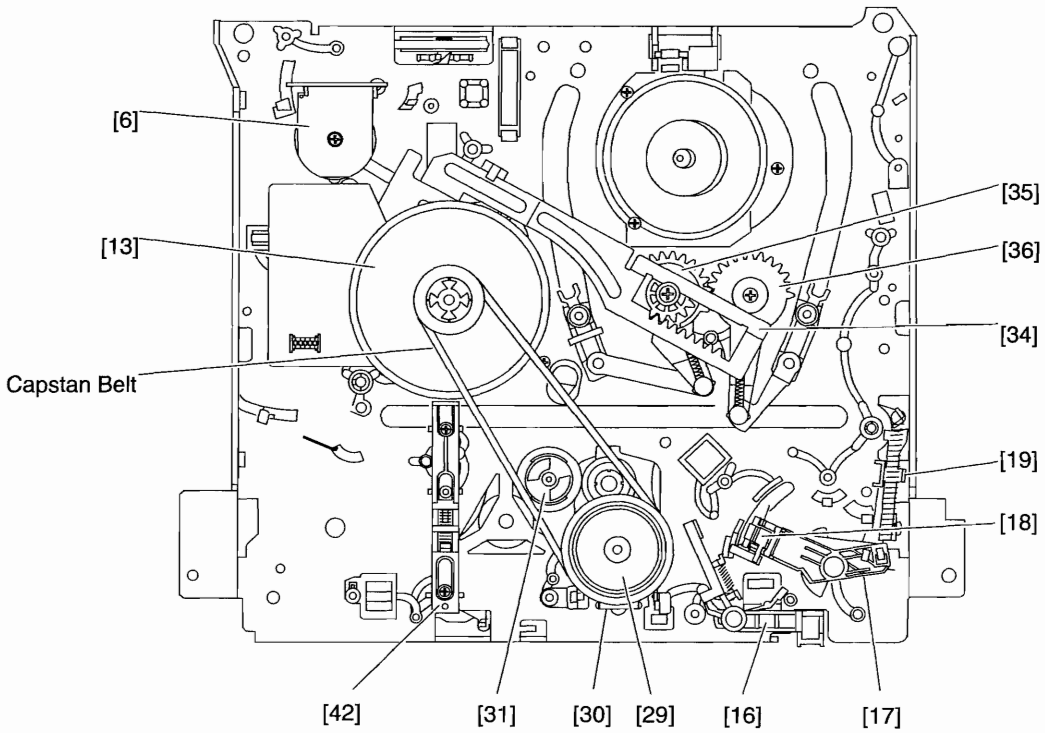
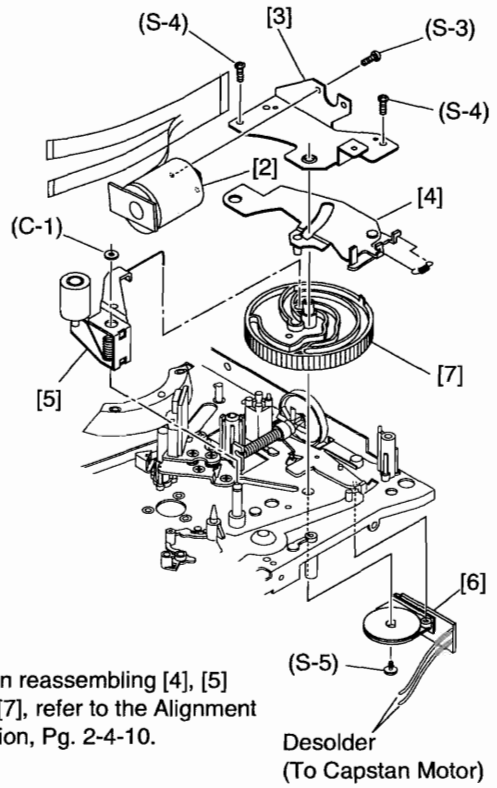
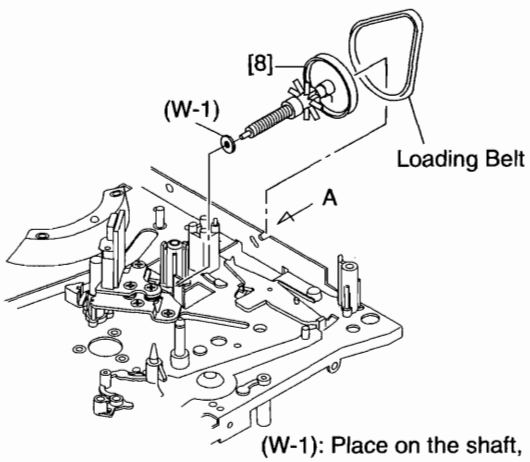


Fig. DM4



When reassembling [4], [5] and [7], refer to the Alignment Section, Pg. 2-4-10.

Fig. DM5



(W-1): Place on the shaft, and then install.

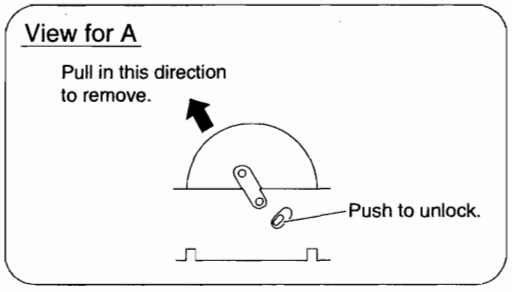


Fig. DM6

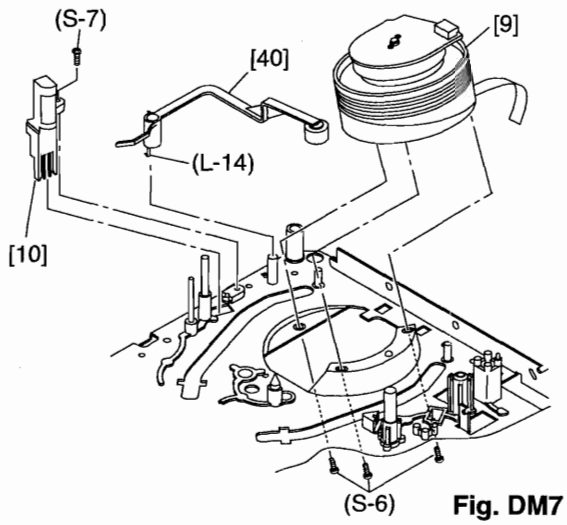


Fig. DM7

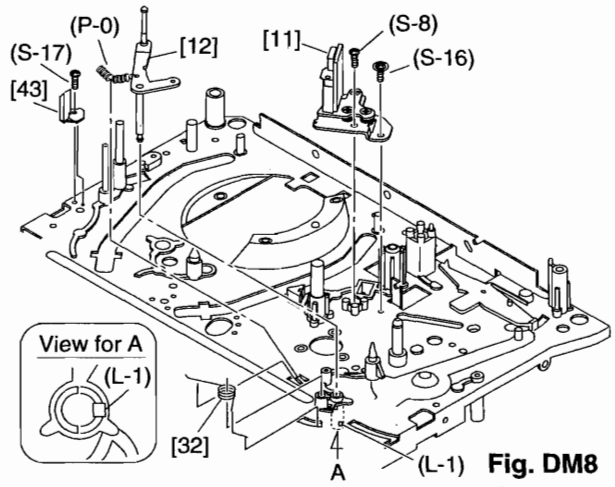


Fig. DM8

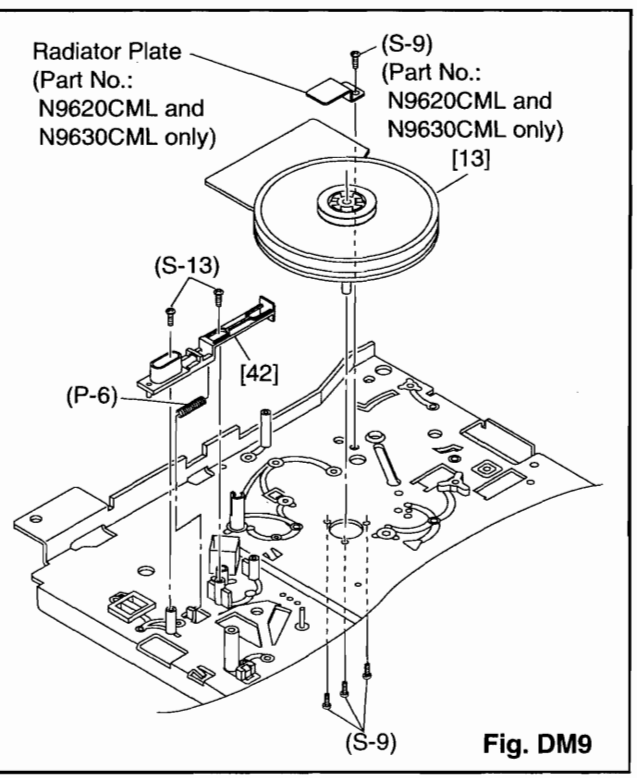


Fig. DM9

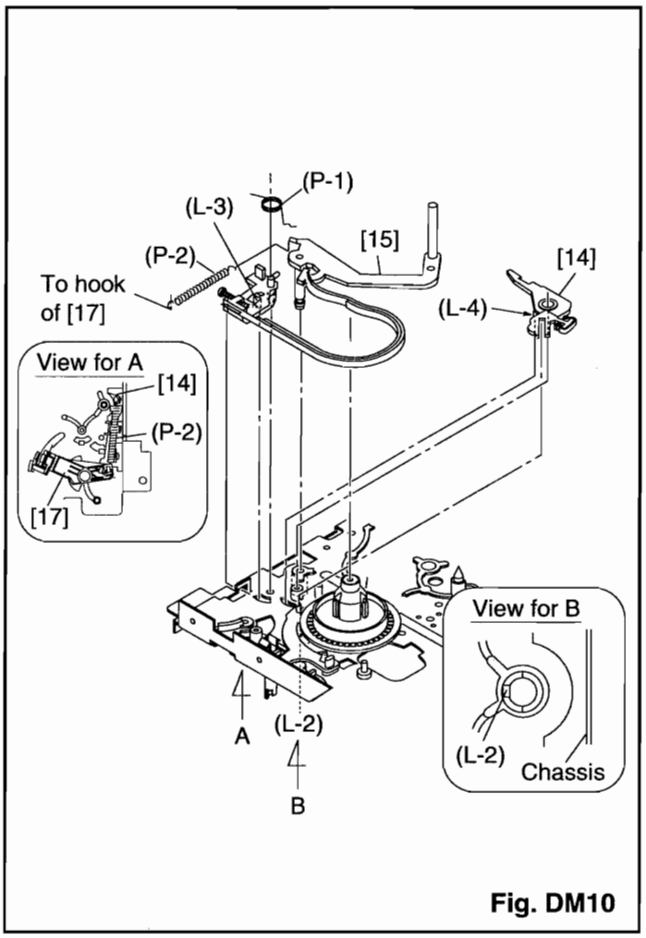


Fig. DM10

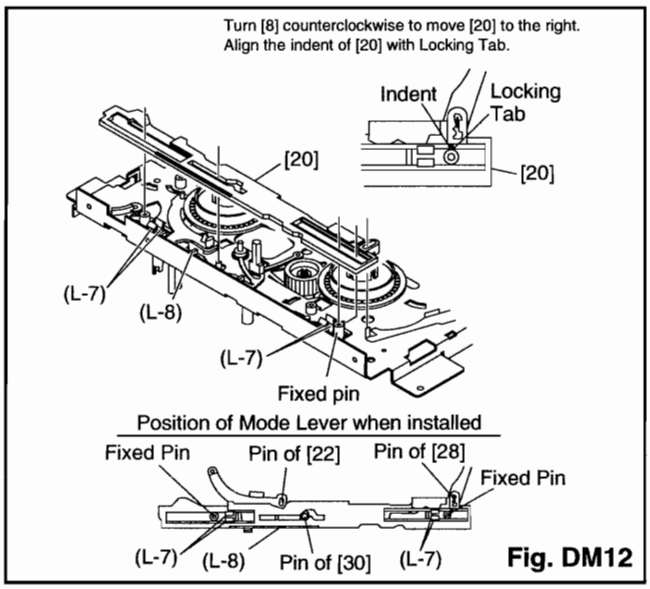


Fig. DM12

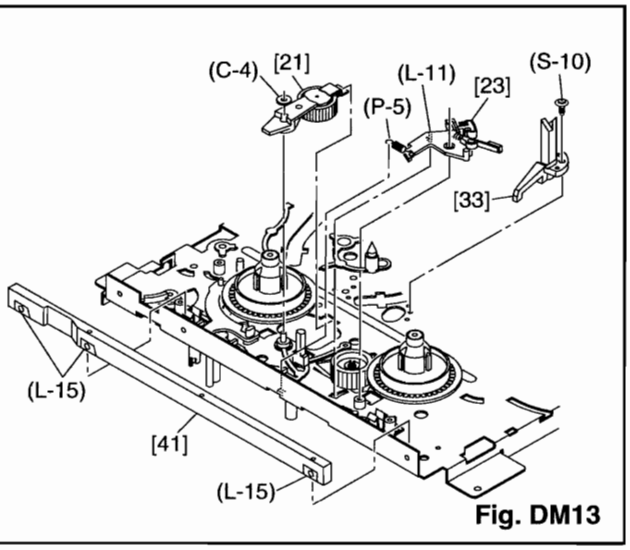


Fig. DM13

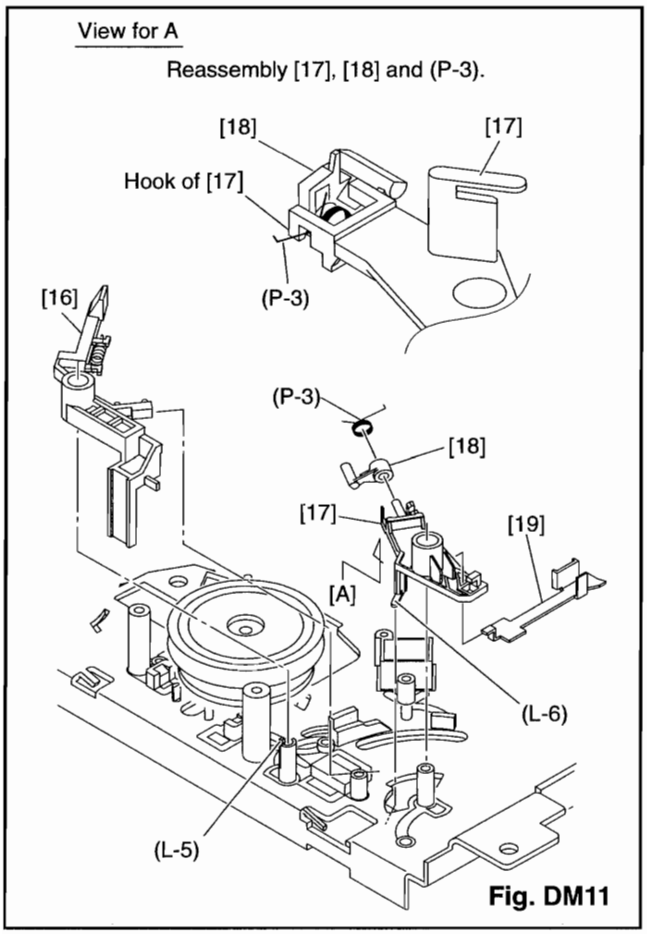


Fig. DM11

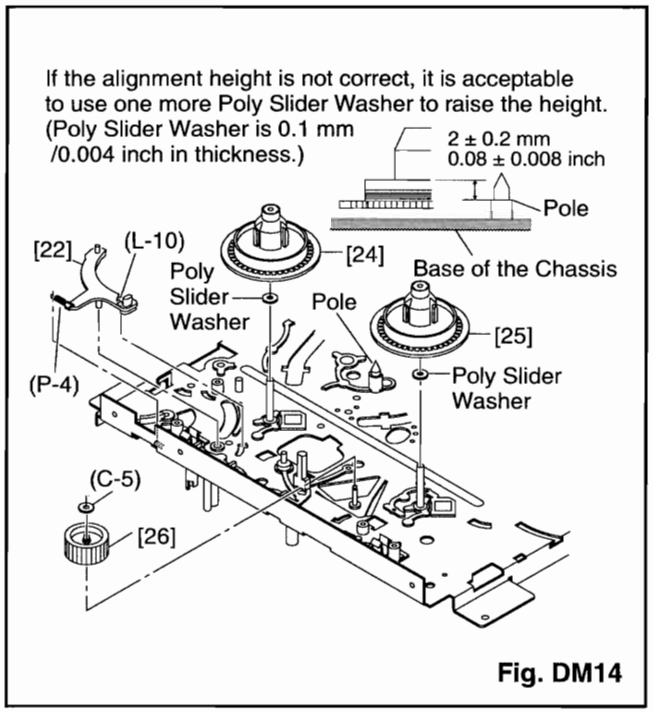


Fig. DM14

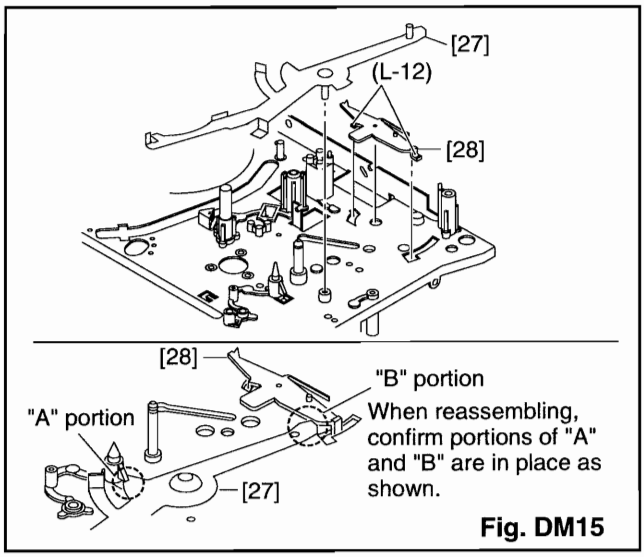


Fig. DM15

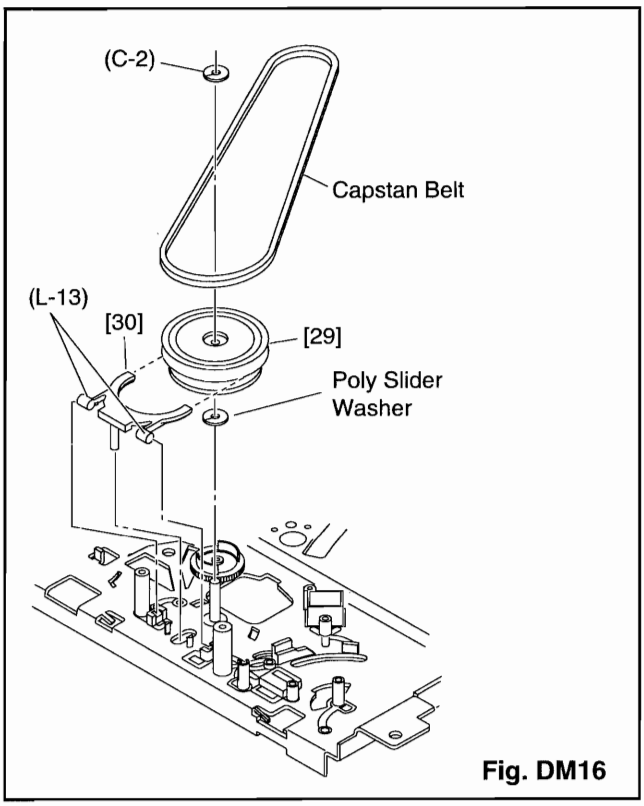


Fig. DM16

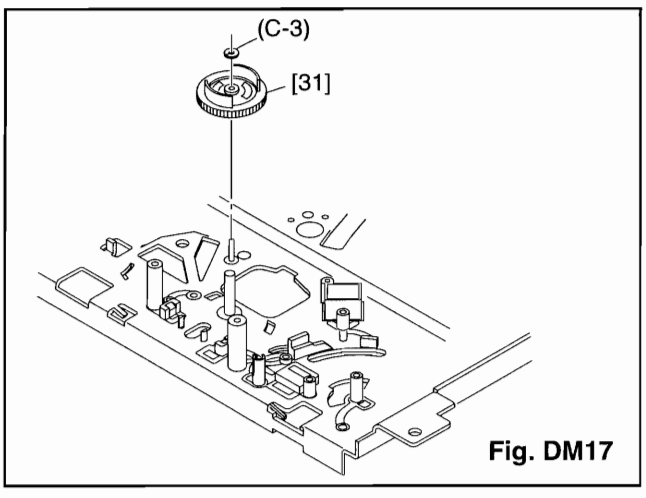


Fig. DM17

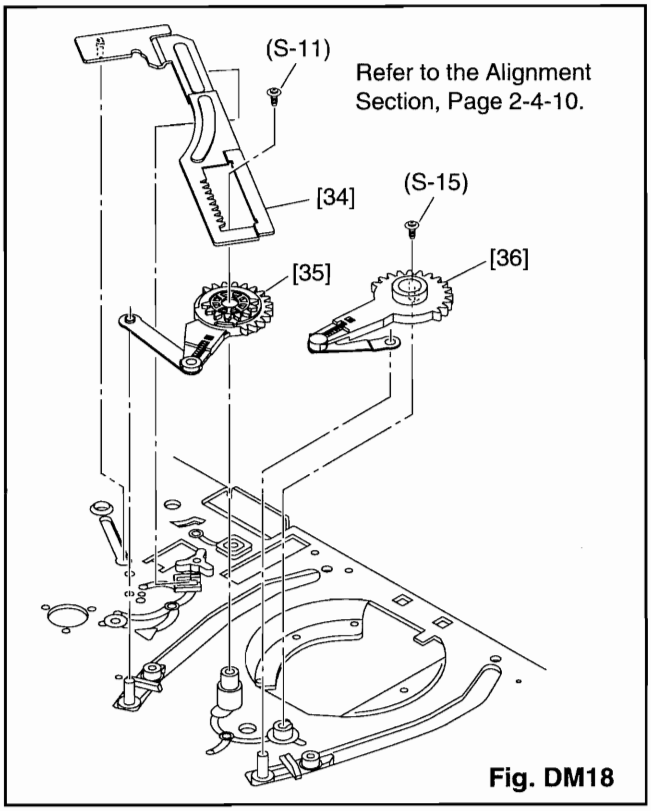


Fig. DM18

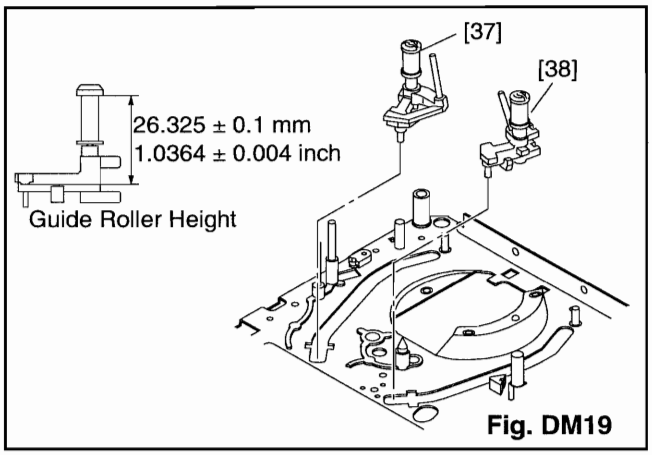


Fig. DM19

Front Loading Assembly

Before following the procedures described below, be sure to remove Front Loading Assembly from the main mechanism of the deck assembly. (See Fig. DM1.) When reassembling, start with the unit in Cassette-in mode and follow the steps in reverse order.

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Guide Holder (F)	T	DM22	2(S-1)	
[2]	[1]	Guide Holder (R)	T	DM22	(L-1)	
*[3]	[3]	Slider Gear	R	DM22 DM23	2(L-2)	Eject Position
*[4]	[3]	Slider Gear	L	DM22 DM23	2(L-3)	Eject Position
		Slider Shaft	T	DM22 DM23		Eject Position
[5]	[1]	Cassette Plate sub Assembly	T	DM20 DM21 DM22	(S-2)	
[6]	[1]	Cassette Guide R	R	DM20 DM21 DM22		
[7]	[1]	Cassette Guide L	L	DM22		
[8]	[8]	Front Door Opener	R	DM22 DM23	(L-4)	Eject Position
[9]	[9]	Rack	R	DM20 DM21 DM22	(L-5)	Cassette in Position
[10]	[9]	Cassette Drive Gear (N)	R	DM20 DM21 DM22	(L-6),Cassette Drive Gear Spring	Cassette in Position
↓ ①	↓ ②	↓ ③	↓ ④	↓ ⑤	↓ ⑥	↓ ⑦

①: Follow steps in sequence. When reassembling, follow the steps in reverse order.
These numbers are also used as Identification (location) No. of parts in the figures.

②: Indicates the part to start disassembling with in order to disassemble the part in column (1).

③: Name of the part

④: Location of the part: T=Top B=Bottom R=Right L=Left

⑤: Figure Number

⑥: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder
e.g., 2(L-2) = two Locking Tabs (L-2).

⑦: Adjustment Information for Installation
(+): Refer to Deck Exploded Views for lubrication.

*[3], *[4]: Slider Gear in Step [3] and that in Step [4] are identical. However, they are divided into two steps because, before reassembling Slider Shaft, one Slider Gear must be preinstalled at either end of Slider Shaft.

Before removing Parts [6], [9], or [10], shift [5] to Cassette-in position.

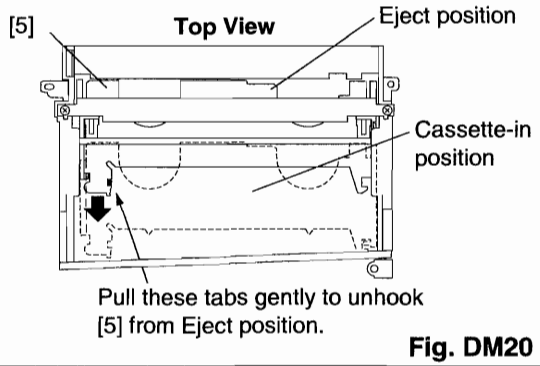


Fig. DM20

Install/remove in Cassette-in position to ensure that [5] is in locked position.

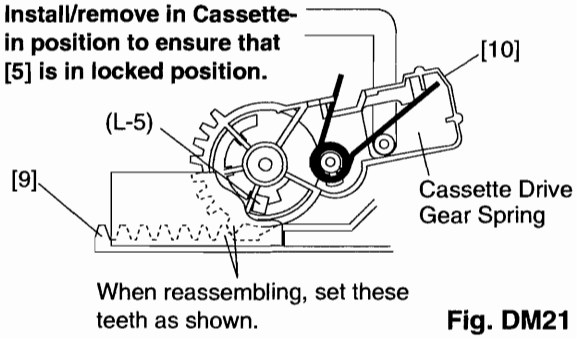
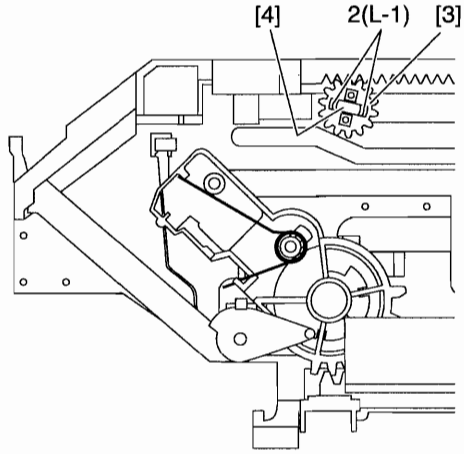


Fig. DM21

View before disassembling [3] and [4] (Installation of Slider Shaft and Slider Gear)



Install [3] and [4] in Eject position.
(When disassembling, [3] and [4] can be removed either in Eject position or Cassette-in position.)

- This figure shows where [3], [4] and other parts are in Eject position.

Fig. DM23

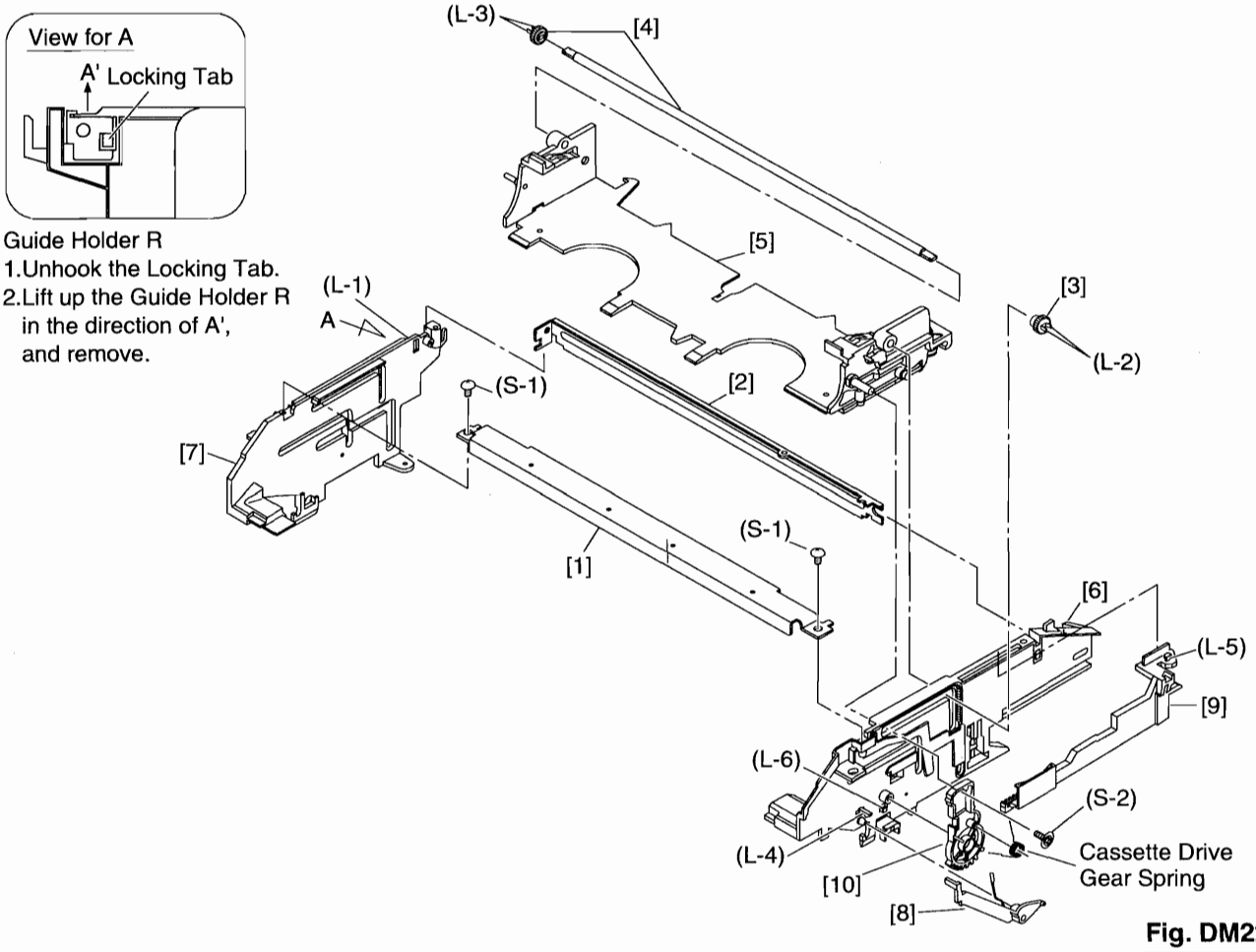


Fig. DM22

ALIGNMENT PROCEDURES OF MECHANISM

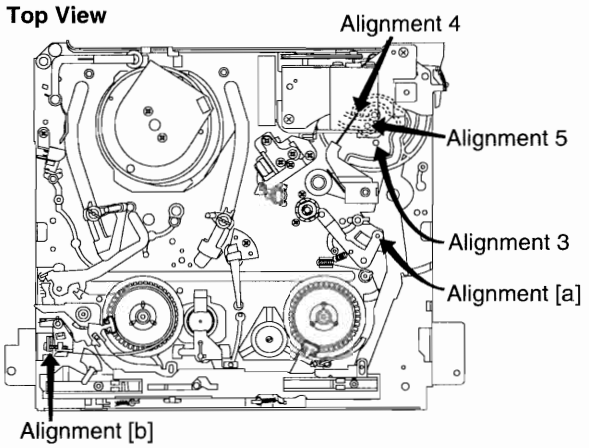
The following procedures describe how to align the individual gears and levers that make up the tape loading/unloading mechanism. Since information about the state of the mechanism is provided to the System Control Circuit only through the Mode Switch, it is essential that the correct relationship between individual gears and levers be maintained.

All alignments are to be performed with the mechanism in Eject mode, in the sequence given. Each procedure assumes that all previous procedures have been completed.

IMPORTANT:

If any one of these alignments is not performed properly, even if off by only one tooth, the unit will unload or stop and it may result in damage to the mechanical or electrical parts.

Alignment points in Eject Position



Alignment [a] and [b] can be done independently of any other alignment

Fig. AL1

Alignment 1

Loading Arm, S and T Assembly

1. Install Loading Arm S and T Assembly so that their triangle marks point to each other as shown in Fig. AL2.

Alignment 2

Loading Lever Assembly

1. Keeping the two triangles pointing at each other, install the Loading Arm T Assembly so that the last tooth of the gear meets the most inside teeth of the Loading Lever Assembly. See Fig. AL2.

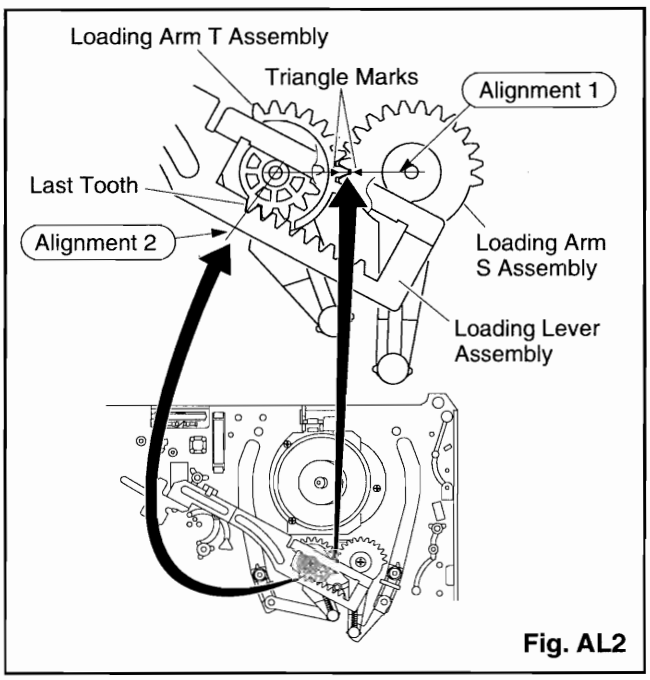


Fig. AL2

Alignment [a]

Tape Guide Arm Assembly

1. Measurement of the screw must be as specified in Fig. AL3.

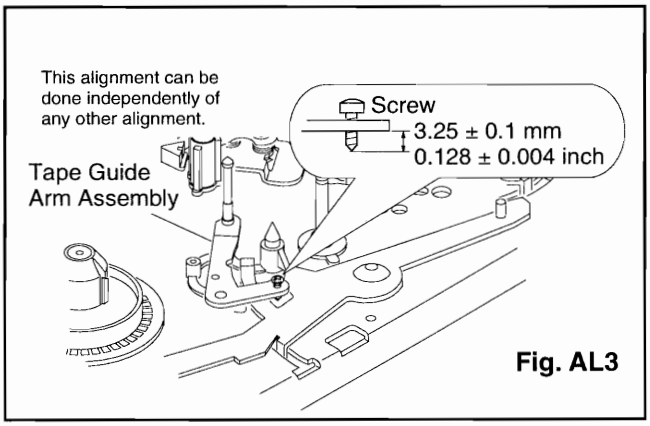


Fig. AL3

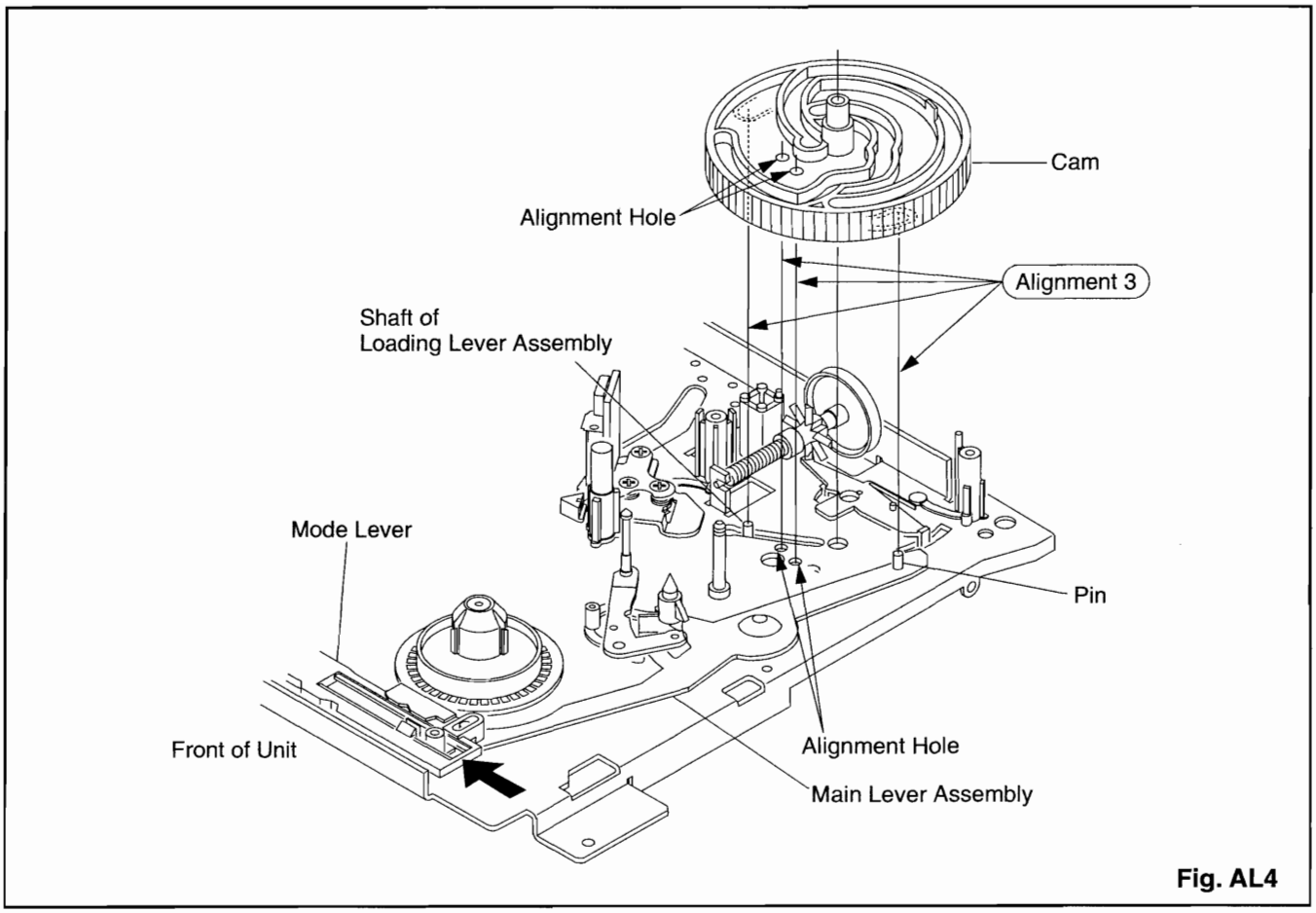


Fig. AL4

Alignment 3

Cam

1. Make sure that the mechanism is in Eject mode so that the shaft of Loading Lever Assembly is in the position shown in Fig. AL4.
2. Align the alignment hole of the Cam with the alignment hole of the base, holding the Cam just above the base.
3. Carefully keeping these two holes aligned, push Mode Lever in the direction of the arrow to install the Cam. The Mode Lever must be pushed to make the pin on the Main Lever Assembly fit in the proper groove in the lower Cam.
4. After installing the Cam, make sure that the alignment hole of the Cam is still aligned with the base hole and that the pin on the Main Lever Assembly and the shaft of the Loading Lever Assembly are inserted into the proper grooves of the lower Cam as specified in Fig. AL4.

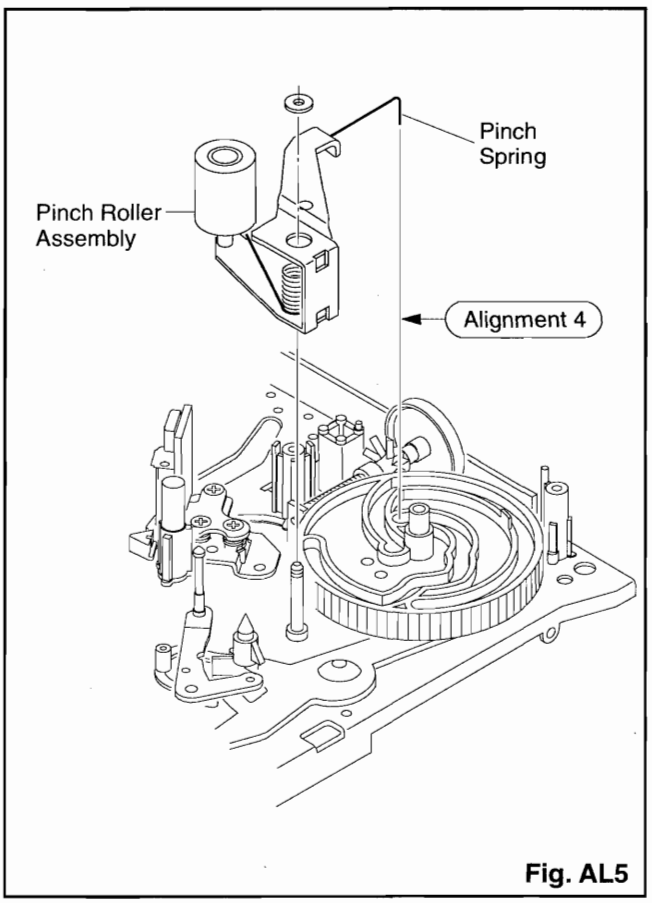


Fig. AL5

Alignment 4

Pinch Roller Assembly

1. Ensure that the Spring of the Pinch Roller Arm Assembly is positioned in the end of the groove of the upper Cam as shown in Fig. AL5.

Alignment 5

Cassette Drive Lever Sub Assembly

1. Ensure that the pin of the Cassette Drive Lever Sub Assembly is positioned in the groove of the upper Cam and that the hole is positioned as shown in Fig. AL6. Then, make sure that the tab of the Cassette Drive Lever Sub Assembly is outside of the tab of the Cam.

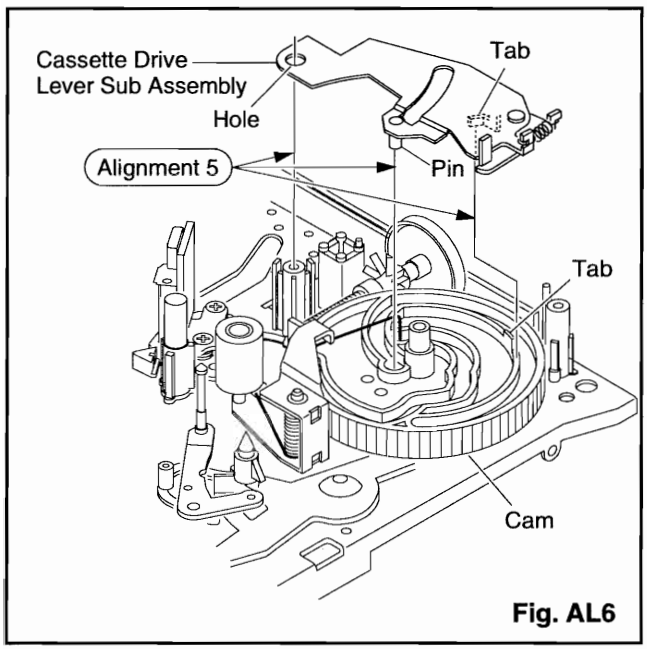


Fig. AL6

Alignment [b]

This alignment can be performed independently of any other alignment.

Tension Lever Assembly

1. Ensure that Tension Lever Assembly is positioned parallel to the chassis' notch as shown in Fig. AL7. This measurement can be made by eye.

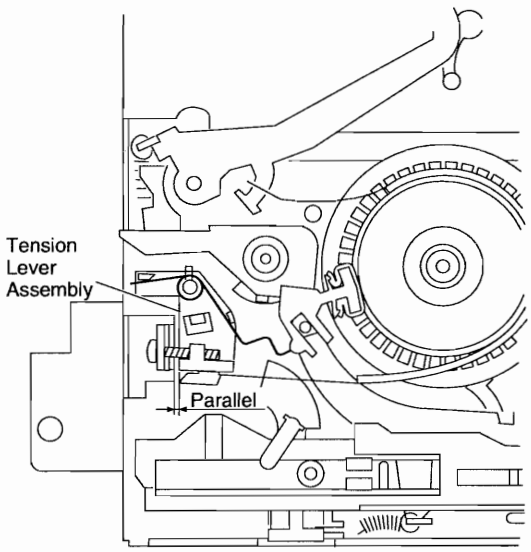


Fig. AL7

EXPLODED VIEWS AND PARTS LIST SECTION

VIDEO CASSETTE RECORDER

2945LF/2965LF/2970LV/ 2965LV/VR-69WF

Sec. 3: Exploded views and Parts List Section

- **Exploded views**
- **Parts List**

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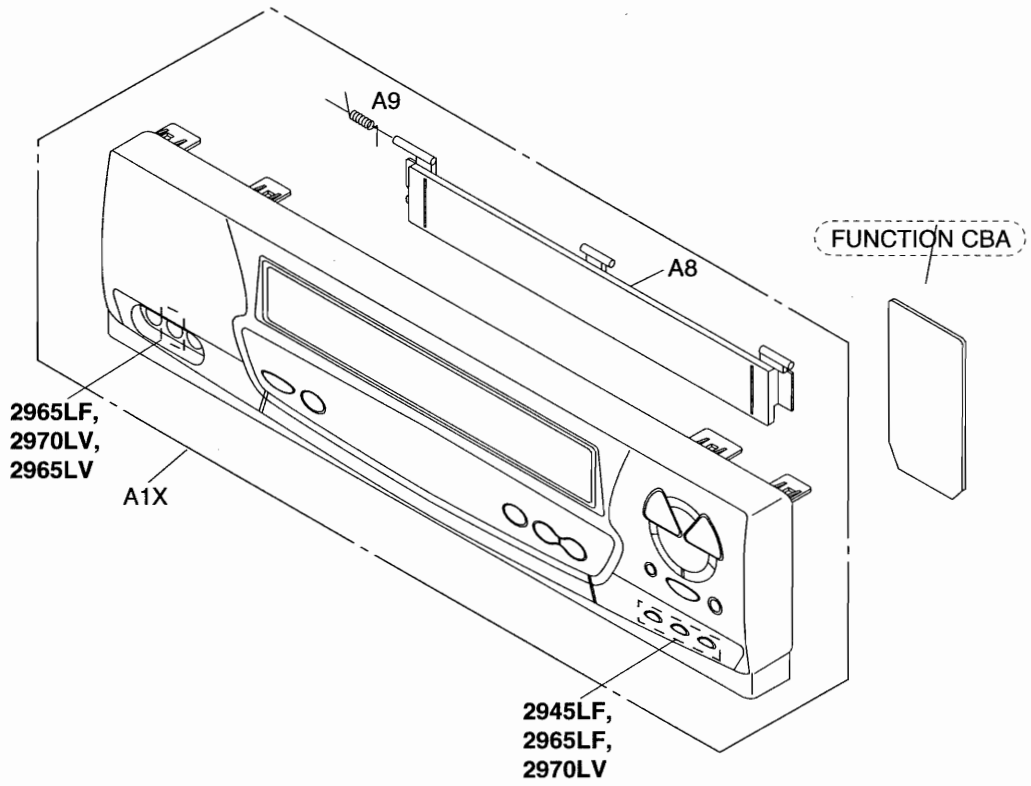
Deck Parts List 3-4-1

EXPLODED VIEWS

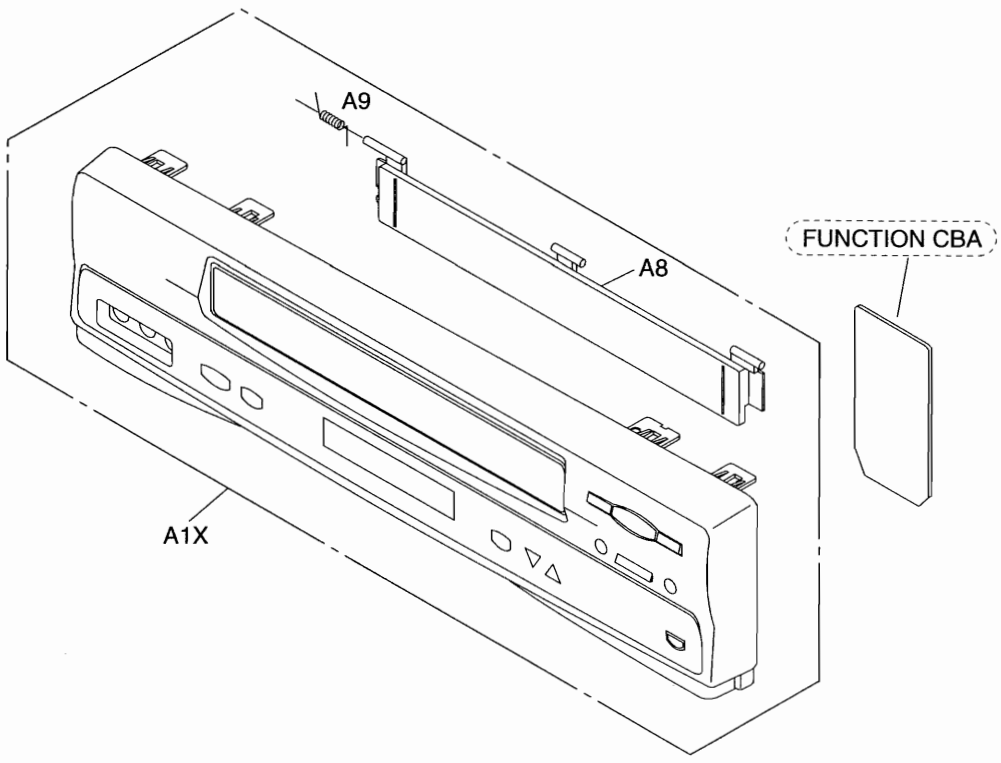
Front Panel

( ) See Electrical Parts List for parts with this mark.

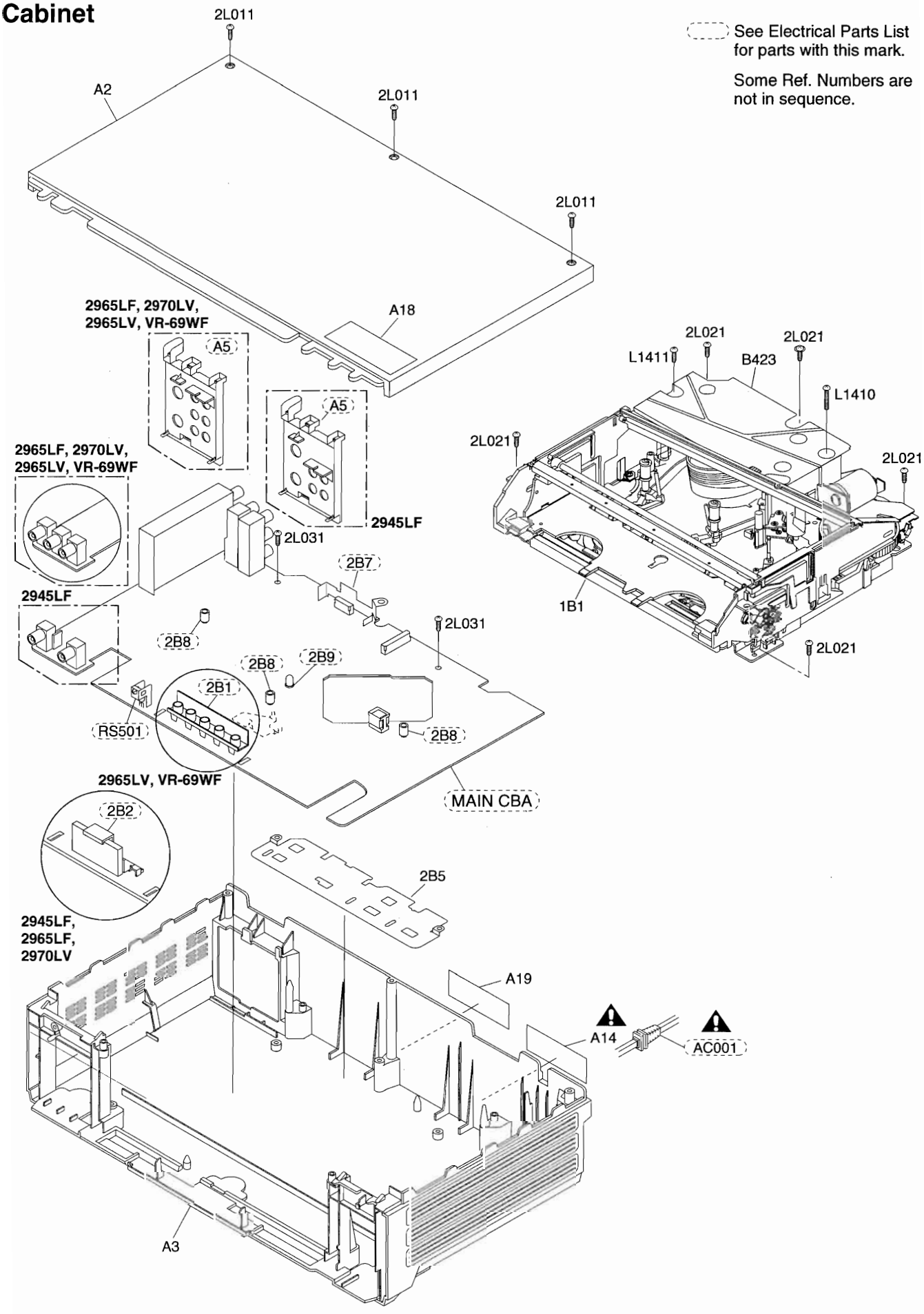
2945LF, 2960LF, 2970LV, 2965LV



VR-69WF

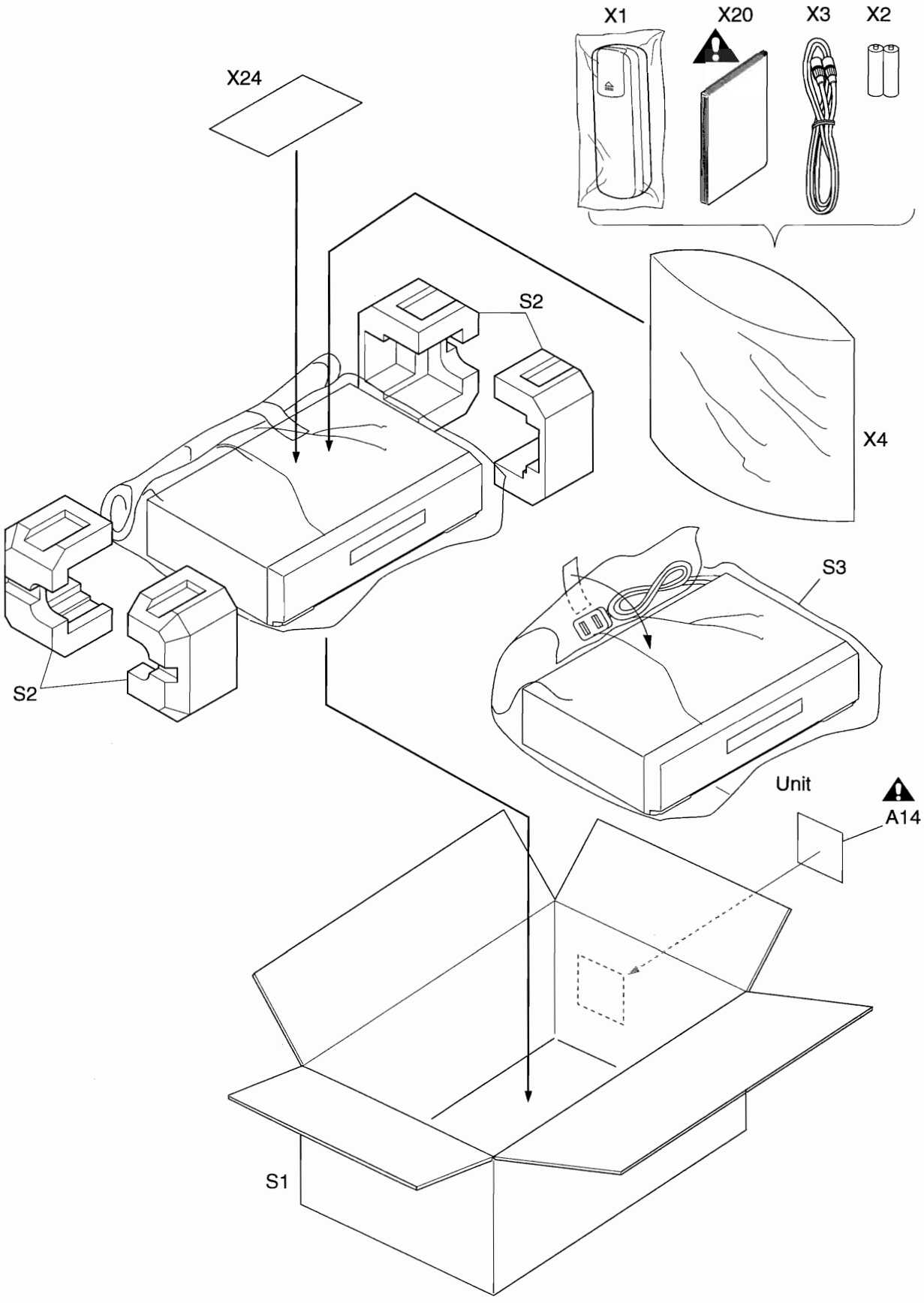


Cabinet


See Electrical Parts List for parts with this mark.
Some Ref. Numbers are not in sequence.
2L011
A2
2L011
2L011
A18
2965LF, 2970LV, 2965LV, VR-69WF
A5
A5
2945LF
2965LF, 2970LV, 2965LV, VR-69WF
2L031
2B7
2945LF
2B8
2L031
2B8
2B9
2B1
RS501
2B8
MAIN CBA
2965LV, VR-69WF
2B2
2B5
2945LF, 2965LF, 2970LV
A19
A14
AC001
A3
2L021
L1411
2L021
B423
2L021
L1410
2L021
2L021
1B1
2L021

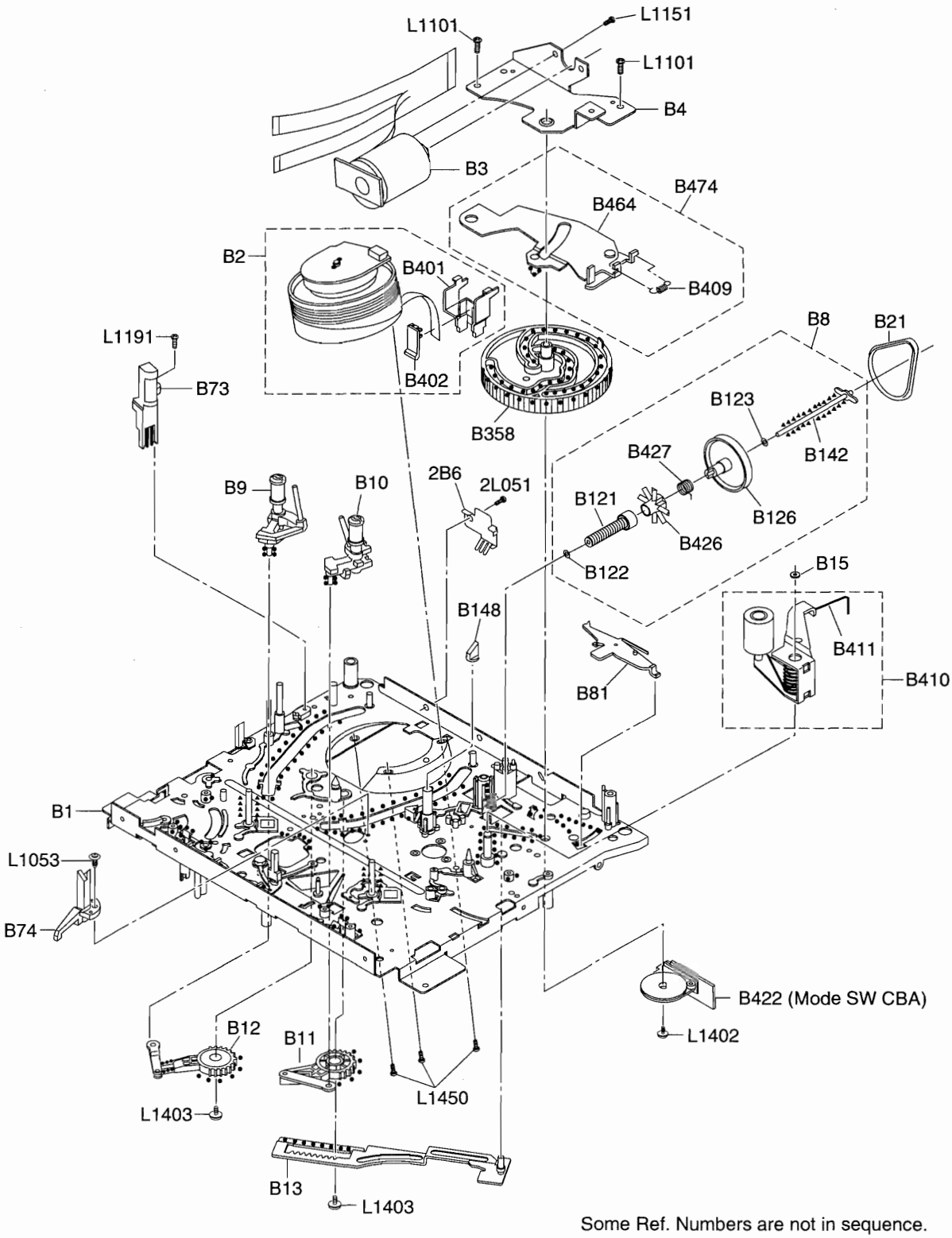
Packing

Some Ref. Numbers are not in sequence.



Deck Mechanism View 1

Mark	Description	Part No.
●●●●●	Floil G-374G (Blue grease)	0VZZ00109
▲▲▲▲▲	Hydro-Fluid EP56 (Spindle oil)	0VZZ00068



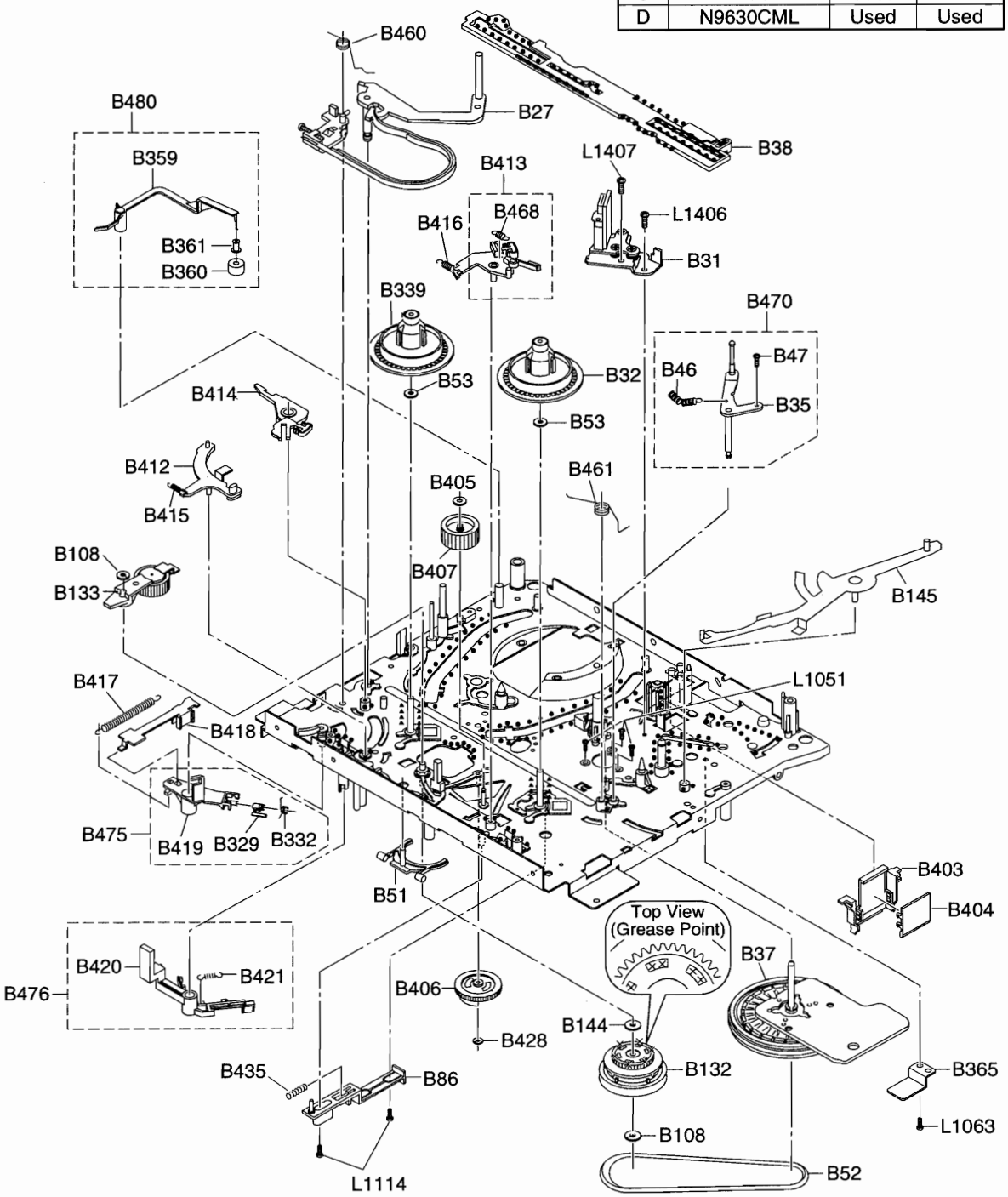
Some Ref. Numbers are not in sequence.

Deck Mechanism View 2

Mark	Description	Part No.
×××××	Sankol FG-84M (White grease)	0VZZ00062
•••••	Floil G-374G (Blue grease)	0VZZ00109
▲▲▲▲▲	Hydro-Fluid EP56 (Spindle oil)	0VZZ00068

Note: Four different, but interchangeable, types of Capstan Motor (B37) may be installed in these models. Based on the type of capstan motor, items B365 and L1063 will be used/not used as shown in the table below.

Type	ID No.	B365	L1063
A	MMDZB12SJ007	Not used	Not used
B	MMDZB12SJ006	Not used	Not used
C	N9620CML	Used	Used
D	N9630CML	Used	Used

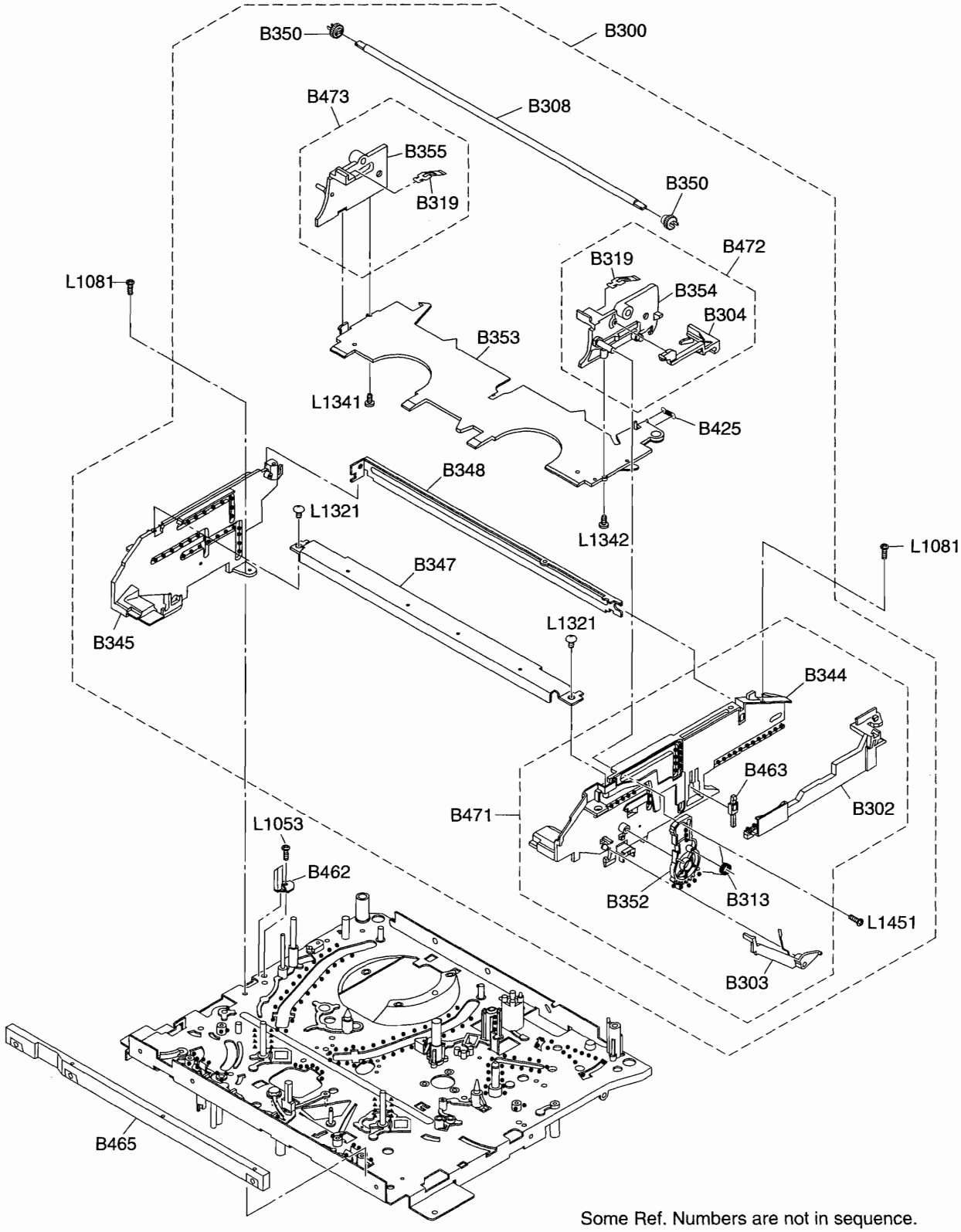


B359, B360, B361 and B480: See the Mechanical Parts List.

Some Ref. Numbers are not in sequence.

Deck Mechanism View 3

Mark	Description		Part No.
●●●●●	Floil G-374G	(Blue grease)	0VZZ00109
▲▲▲▲▲	Hydro-Fluid EP56	(Spindle oil)	0VZZ00068



Some Ref. Numbers are not in sequence.

MECHANICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

Note:

B359, B360, B361 and B480:
See Deck Exploded View 2. (Refer to Page 3-1-5)

Comparison chart of Models and Marks

Model	Mark
2945LF	A
2965LF	B
2970LV	C
2965LV	D
VR-69WF	E

Ref. No.	Mark	Description	Part No.
A1X	A	FRONT ASSEMBLY	0VM202554
A1X	B	FRONT ASSEMBLY	0VM202555
A1X	C	FRONT ASSEMBLY	0VM202491
A1X	D	FRONT ASSEMBLY	0VM202552
A1X	E	FRONT ASSEMBLY	0VM202556
A2		CASE, TOP(U19)	0VM100779
A3		CHASSIS(U19)	0VM000111
A5	A	JACK BOARD(U19 MONO)	0VM202442
A5	B,C,D, E	JACK BOARD HI-FI	0VM202461
A8	A	DOOR, CASSETTE	0VM408706
A8	B,C,D	DOOR, CASSETTE	0VM408708
A8	E	DOOR, CASSETTE	0VM409700
A9		SPRING, DOOR U15	0VM408617
A14 ⚠	A	LABEL, BAR CODE or	0VM409910
	A	LABEL, BAR CODE	0VM409510
A14 ⚠	B	LABEL, BAR CODE or	0VM409911
	B	LABEL, BAR CODE	0VM409510
A14 ⚠	C	LABEL, BAR CODE or	0VM409449
	C	LABEL, BAR CODE	0VM409510
A14 ⚠	D	LABEL, BAR CODE or	0VM409908
	D	LABEL, BAR CODE	0VM409510
A14 ⚠	E	LABEL, BAR CODE or	0VM409702
	E	LABEL, BAR CODE	0VM409510
A18	A,B,C, D	LABEL, TELEPHONE NUMBER (SALES SUPPLY)	0VM408663
A18	E	LABEL, TELEPHONE NUMBER	0VM405999
A19	C,D	LABEL, VCR PLUS	0VM409825
AC001 ⚠		AC CORD 9806190 (See Electrical Parts List) or	
⚠		AC CORD LA-2145 (See Electrical Parts List)	
B359		CLEANER LEVER MK7	0VM303350
B360		CLEAN ROLLER MK4	0VM406123
B361		CLEAN BEARING MK4	0VM406124
B423		SHIELD, CYLINDER	0VM202493
B480		CLEANER ASSEMBLY MK7	0VSA09032
1B1	A	DECK ASSEMBLY	N8042FL
1B1	B,C,D, E	DECK ASSEMBLY	N8062XL
2B1	D,E	HOLDER, L.E.D.(U19) (See Electrical Parts List)	
2B2	A,B,C	HOLDER, F.I.P. 2 (See Electrical Parts List)	
2B5		PLATE, SHIELD(U19)	0VM303509
2B7		PLATE, EARTH(U19) (See Electrical Parts List)	
2B8		BUSH, LED(F) (See Electrical Parts List)	
2B9		BUSH, LED(E) (See Electrical Parts List)	
2L011		SCREW, P-TIGHT 3X10 BIND HEAD+	GBEP3100
2L021		SCREW, P-TIGHT M3X10 WASHER HEAD+	GCMP3100
2L031		SCREW , P-TIGHT 3X8 BIND + CHROME	GBMP3080
L1410		SCREW, P-TIGHT 3X25 BIND HEAD+	GBMP3250
L1411		SCREW, S-TIGHT M3X6 BIND HEAD+	GBMS3060
PACKING			
S1	A	GIFT BOX CARTON	0VM303701
S1	B	GIFT BOX CARTON	0VM303702
S1	C	GIFT BOX CARTON	0VM303616A
S1	D	GIFT BOX CARTON	0VM303699A
S1	E	GIFT BOX CARTON	0VM303715
S2		STYROFOAM(U19)	0VM202459
S3		UNIT, BAG	0VM406453B
ACCESSORIES			
X1	A,B	REMOTE CONTROL UNIT 364/CRC002	N9393UD
X1	C	REMOTE CONTROL UNIT 364/CRC003	N9311UD
X1	D	REMOTE CONTROL UNIT 364/CRC002	N9388UD
X1	E	REMOTE CONTROL UNIT 364/CRC004	N9381UD
X2		DRY BATTERY R6P UM3 or	XB0M451GH001
		DRY BATTERY R6SSE/2S or	XB0M451MS002
		DRY BATTERY R6P	XB0M451T0001
X3		RF CABLE LP960601 or	WPZ0102LG006
		RF CABLE FC-NTSC-1	5750398
X4		ACCESSORY BAG T=0.03	0VM409454
X20 ⚠	A	OWNER'S MANUAL	0VMN02253
X20 ⚠	B	OWNER'S MANUAL	0VMN02254
X20 ⚠	C	OWNER'S MANUAL	0VMN02197
X20 ⚠	D	OWNER'S MANUAL	0VMN02251
X20 ⚠	E	OWNER'S MANUAL	0VMN02256
X24	A,B,C, D	RETURN STOP SHEET	0VM409358
X24	E	RETURN STOP SHEET	0VM409357

ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

NOTES:

1. Parts that not assigned part numbers (----------) are not available.
2. Tolerance of Capacitors and Resistors are noted with the following symbols.

C.....±0.25%	D.....±0.5%	F.....±1%
G.....±2%	J.....±5%	K.....±10%
M.....±20%	N.....±30%	Z.....+80/-20%

3. LED Type (A) or (B) or (C):
   When it is necessary to replace one or more of the following diodes, all five should be replaced: D595, D596, D597, D598, D599.

Comparison chart of Models and Marks

Model	Mark
2945LF	A
2965LF	B
2970LV	C
2965LV	D
VR-69WF	E

MCV CBA

Ref. No.	Mark	Description	Part No.
	A	MCV CBA (MAIN+FUNCTION)	0VSA09586
	B	MCV CBA (MAIN+FUNCTION)	0VSA09589
	C	MCV CBA (MAIN+FUNCTION)	0VSA09626
	D	MCV CBA (MAIN+FUNCTION)	0VSA09629
	E	MCV CBA (MAIN+FUNCTION)	0VSA09473
		Consists of the following:	
		Main CBA (MCV-A)	----------
		Function CBA (MCV-B)	----------

Main CBA (MCV-A)

Ref. No.	Mark	Description	Part No.
		Main CBA (MCV-A)	----------
		CAPACITORS	
C001 ⚠		METALLIZED FILM CAP. 0.022µF/250V M or	CA2E223MS005
⚠		METALLIZED FILM CAP. 0.022µF/250V M	CT2E223DC009
C002 ⚠		SAFETY CAP. 3300pF/125V or	CCG2BMA0E332
⚠		SAFETY CAP. 3300pF/250V or	CCG2EMA0E332
⚠		SAFETY CAP. 3300pF/250V	CCG2EMA0F332
C003		ELECTROLYTIC CAP. 82µF/200V M or	CA2D820EA034
		ELECTROLYTIC CAP. 82µF/200V M or	CA2D820NC002
		ELECTROLYTIC CAP. 82µF/200V M or	CA2D820S6005
		ELECTROLYTIC CAP. 82µF/200V M	CA2D820V8002
C004		CERAMIC CAP. B K 120pF/500V	CCD2JKP0B121
C006	A,B,C	SEMICONDUCTOR CAP. SR K 0.018µF/25V or	CDA1EKS0X183
	A,B,C	SEMICONDUCTOR CAP. SR K 0.018µF/25V	12Y2183S
C006	D,E	SEMICONDUCTOR CAP. SR K 0.012µF/25V or	CDA1EKS0X123
	D,E	SEMICONDUCTOR CAP. SR K 0.012µF/25V	12Y2123S
C007		CERAMIC CAP. B K 3300pF/50V	CCD1JKS0B332
C008		CERAMIC CAP.(AX) Y M 8200pF/16V	CDA1CMT0Y822
C009		CERAMIC CAP.(AX) Y M 0.012µF/16V	CDA1CMT0Y123
C011	A,B,C	ELECTROLYTIC CAP. 22µF/50V M	CE1JMASDL220
C013		ELECTROLYTIC CAP. 4.7µF/50V M H7	CE1JMASSL4R7
C017		CERAMIC CAP. B K 1500pF/50V	CCD1JKS0B152
C018		ELECTROLYTIC CAP. 470µF/16V M	CE1CMASDL471
C020		ELECTROLYTIC CAP. 1000µF/10V M	CE1AMZPDL102
C021		ELECTROLYTIC CAP. 470µF/10V M	CE1AMASDL471
C022	A,B,C	ELECTROLYTIC CAP. 100µF/10V M	CE1AMASDL101
C024		SEMICONDUCTOR CAP. SR K 0.018µF/25V or	CDA1EKS0X183
		SEMICONDUCTOR CAP. SR K 0.018µF/25V	12Y2183S
C026		ELECTROLYTIC CAP. 2.2µF/250V M	CE2EMASTH2R2
C051		ELECTROLYTIC CAP. 2.2µF/50V M	CE1JMASDL2R2
C055		ELECTROLYTIC CAP. 220µF/6.3V M	CE0KMASDL221
C060	A,B,C	CERAMIC CAP. YV Z 0.01µF/50V or	CCD1JZSYV103
	A,B,C	CERAMIC CAP. F Z 0.01µF/50V	CCD1JZS0F103
C061		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C251		ELECTROLYTIC CAP. 47µF/6.3V M	CE0KMASDL470
C252		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C253		ELECTROLYTIC CAP. 1µF/50V M	CE1JMASDL010
C254		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C255		CERAMIC CAP.(AX) Y M 0.01µF/16V	CDA1CMT0Y103
C301		ELECTROLYTIC CAP. 4.7µF/25V M H7	CE1EMASSL4R7
C302		ELECTROLYTIC CAP. 47µF/6.3V M H7	CE0KMASSL470
C303		ELECTROLYTIC CAP. 10µF/16V M H7	CE1CMASSL100
C304		ELECTROLYTIC CAP. 47µF/6.3V M H7	CE0KMASSL470
C305		CERAMIC CAP.(AX) F Z 0.1µF/50V	CCA1JZT0F104
C306		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C307		ELECTROLYTIC CAP. 47µF/6.3V M H7	CE0KMASSL470
C308		CERAMIC CAP.(AX) F Z 0.1µF/50V	CCA1JZT0F104
C309		CERAMIC CAP.(AX) B J 390pF/50V or	CCA1JJT0B391
		CERAMIC CAP.(AX) B K 390pF/50V	CCA1JKT0B391
C310		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C311		CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C312		CHIP CERAMIC CAP. SL J 180pF/50V	CHE1JJBSL181
C313		PCB JUMPER D0.6-P5.0	JW5.0T
C315		CERAMIC CAP.(AX) Y M 0.01µF/16V	CDA1CMT0Y103
C316		ELECTROLYTIC CAP. 22µF/6.3V M H7	CE0KMASSL220
C317		CHIP CERAMIC CAP. BK 1800pF/50V	CHE1JKB0B181
C318		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C319		CERAMIC CAP.(AX) Y M 0.01µF/16V	CDA1CMT0Y103
C320		ELECTROLYTIC CAP. 10µF/16V M	CE1CMASDL100
C321		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C322		ELECTROLYTIC CAP. 10µF/16V M H7	CE1CMASSL100
C323		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C324		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C325		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C326		ELECTROLYTIC CAP. 22µF/6.3V M H7	CE0KMASSL220
C327		CHIP CERAMIC CAP. SL J 390pF/50V	CHE1JJBSL391
C328		CERAMIC CAP.(AX) Y M 0.01µF/16V	CDA1CMT0Y103
C329		CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBSL101
C330		CERAMIC CAP.(AX) Y M 0.01µF/16V	CDA1CMT0Y103
C331		ELECTROLYTIC CAP. 47µF/6.3V M H7	CE0KMASSL470

Ref. No.	Mark	Description	Part No.
C332		CERAMIC CAP.(AX) F Z 0.022μF/25V	CDA1EZT0F223
C334		CERAMIC CAP.(AX) F Z 0.1μF/50V	CCA1JZT0F104
C337		ELECTROLYTIC CAP. 1μF/50V M	CE1JMASDL010
C338		ELECTROLYTIC CAP. 1μF/50V M H7	CE1JMASSL010
C339		CHIP CERAMIC CAP. B K 5600pF/50V	CHE1JKB0B562
C340		ELECTROLYTIC CAP. 1μF/50V M H7	CE1JMASSL010
C341		CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C342		ELECTROLYTIC CAP. 1μF/50V M H7	CE1JMASSL010
C343		ELECTROLYTIC CAP. 10μF/16V M H7	CE1CMASSL100
C345		CERAMIC CAP.(AX) F Z 0.047μF/16V	CDA1CZT0F473
C346		CERAMIC CAP.(AX) F Z 0.047μF/16V	CDA1CZT0F473
C347		CHIP CERAMIC CAP. B K 470pF/50V	CHE1JKB0B471
C348		CHIP CERAMIC CAP. SL J 47pF/50V	CHE1JJBSL470
C350		CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBSL101
C352		CERAMIC CAP.(AX) B J 220pF/50V or	CCA1JJT0B221
		CERAMIC CAP.(AX) B K 220pF/50V	CCA1JKT0B221
C355		ELECTROLYTIC CAP. 47μF/6.3V M H7	CE0KMASSL470
C356		CERAMIC CAP.(AX) X K 1800pF/16V	CDA1CKT0X182
C391		ELECTROLYTIC CAP. 100μF/10V M	CE1AMASDL101
C392		ELECTROLYTIC CAP. 470μF/6.3V M	CE0KMASDL471
C401		ELECTROLYTIC CAP. 4.7μF/25V M H7	CE1EMASSL4R7
C402		CERAMIC CAP.(AX) B J 1000pF/50V or	CDA1JJT0B102
		CERAMIC CAP.(AX) B K 1000pF/50V	CDA1JKT0B102
C403		CHIP CERAMIC CAP. F Z 0.1μF/25V or	CHE1EZB0F104
		CHIP CERAMIC CAP. F Z 0.1μF/50V	CHE1JZB0F104
C404		CHIP CERAMIC CAP. B K 0.012μF/50V	CHE1JKB0B123
C405		ELECTROLYTIC CAP. 10μF/16V M H7	CE1CMASSL100
C406		CERAMIC CAP.(AX) X K 2700pF/16V	CDA1CKT0X272
C407		ELECTROLYTIC CAP. 4.7μF/25V M H7	CE1EMASSL4R7
C408		CHIP CERAMIC CAP. B K 1000pF/50V	CHE1JKB0B102
C410		CERAMIC CAP.(AX) Y M 0.01μF/16V	CDA1CMT0Y103
C411		ELECTROLYTIC CAP. 22μF/6.3V M H7	CE0KMASSL220
C412	A	CERAMIC CAP.(AX) F Z 0.1μF/50V	CCA1JZT0F104
C413	A	CERAMIC CAP.(AX) F Z 0.1μF/50V	CCA1JZT0F104
C414		CERAMIC CAP.(AX) F Z 0.1μF/50V	CCA1JZT0F104
C415		ELECTROLYTIC CAP. 33μF/6.3V M H7	CE0KMASSL330
C416	A	CHIP CERAMIC CAP. B K 6800pF/50V	CHE1JKB0B682
C416	B,C,D,E	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C417		CHIP CERAMIC CAP. B K 1000pF/50V	CHE1JKB0B102
C421		ELECTROLYTIC CAP. 2.2μF/50V M H7	CE1JMASSL2R2
C422		ELECTROLYTIC CAP. 47μF/6.3V M H7	CE0KMASSL470
C423		ELECTROLYTIC CAP. 220μF/6.3V M H7	CE0KMASSL221
C424		CERAMIC CAP. B K 470pF/100V or	CCD2AKP0B471
		CERAMIC CAP. B K 470pF/500V	CCD2JKS0B471
C425		FILM CAP.(P) 0.018μF/100V J or	CMA2AJS00183
		FILM CAP.(P) 0.018μF/100V J TV or	CMB2AJS00183
		FILM CAP.(P) 0.018μF/100V J	1255183S
C451	B,C,D,E	ELECTROLYTIC CAP. 10μF/16V M H7	CE1CMASSL100
C452	B,C,D,E	ELECTROLYTIC CAP. 1μF/50V M H7	CE1JMASSL010
C453	B,C,D,E	ELECTROLYTIC CAP. 22μF/10V M	CE1AMASDL220
C454	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/25V M	CE1EMASDL4R7
C455	B,C,D,E	CERAMIC CAP.(AX) Y M 0.01μF/16V	CDA1CMT0Y103
C456	B,C,D,E	ELECTROLYTIC CAP. 22μF/10V M H7	CE1AMASSL220
C457	B,C,D,E	ELECTROLYTIC CAP. 22μF/10V M H7	CE1AMASSL220
C458	B,C,D,E	CERAMIC CAP.(AX) X K 4700pF/16V	CDA1CKT0X472
C459	B,C,D,E	CHIP CERAMIC CAP. B K 3300pF/50V	CHE1JKB0B332
C460	B,C,D,E	CERAMIC CAP.(AX) Y M 0.01μF/16V	CDA1CMT0Y103
C461	B,C,D,E	ELECTROLYTIC CAP. 47μF/10V M	CE1AMASDL470
C462	B,C,D,E	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBSL101
C463	B,C,D,E	ELECTROLYTIC CAP. 1μF/50V M	CE1JMASDL010
C464	B,C,D,E	CERAMIC CAP.(AX) X K 3300pF/16V	CDA1CKT0X332
C465	B,C,D,E	CERAMIC CAP.(AX) X K 4700pF/16V	CDA1CKT0X472
C466	B,C,D,E	ELECTROLYTIC CAP. 22μF/10V M H7	CE1AMASSL220
C467	B,C,D,E	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C468	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/25V M H7	CE1EMASSL4R7

Ref. No.	Mark	Description	Part No.
C469	B,C,D,E	ELECTROLYTIC CAP. 22μF/10V M H7	CE1AMASSL220
C470	B,C,D,E	ELECTROLYTIC CAP. 1μF/50V M	CE1JMASDL010
C472	B,C,D,E	ELECTROLYTIC CAP. 10μF/16V M	CE1CMASDL100
C473	B,C,D,E	CHIP CERAMIC CAP. F Z 0.1μF/25V or	CHE1EZB0F104
	B,C,D,E	CHIP CERAMIC CAP. F Z 0.1μF/50V	CHE1JZB0F104
C474	B,C,D,E	ELECTROLYTIC CAP. 2.2μF/50V M H7	CE1JMASSL2R2
C475	B,C,D,E	ELECTROLYTIC CAP. 2.2μF/50V M H7	CE1JMASSL2R2
C476	B,C,D,E	ELECTROLYTIC CAP. 47μF/16V M H7	CE1CMASSL470
C478	B,C,D,E	ELECTROLYTIC CAP. 1μF/50V M H7	CE1JMASSL010
C479	B,C,D,E	CERAMIC CAP.(AX) Y M 0.01μF/16V	CDA1CMT0Y103
C481	B,C,D,E	CHIP CERAMIC CAP. B K 2200pF/50V	CHE1JKB0B222
C482	B,C,D,E	ELECTROLYTIC CAP. 0.47μF/50V M H7	CE1JMASSLR47
C501		CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBSL101
C502		CERAMIC CAP.(AX) F Z 0.047μF/16V	CDA1CZT0F473
C503		CHIP CERAMIC CAP. B K 4700pF/50V	CHE1JKB0B472
C521		ELECTROLYTIC CAP. 330μF/6.3V M	CE0KMASDL331
C522		CERAMIC CAP.(AX) B J 1000pF/50V or	CDA1JJT0B102
		CERAMIC CAP.(AX) B K 1000pF/50V	CDA1JKT0B102
C523		ELECTROLYTIC CAP. 220μF/6.3V M H7	CE0KMASSL221
C524		CERAMIC CAP.(AX) F Z 0.022μF/25V	CDA1EZT0F223
C525		ELECTROLYTIC CAP. 47μF/6.3V M	CE0KMASDL470
C526		CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C527		CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C536		CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JJBSL270
C537		ELECTROLYTIC CAP. 22μF/10V M H7	CE1AMASSL220
C538		CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C539		ELECTROLYTIC CAP. 1μF/50V M H7	CE1JMASSL010
C540		CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C541		CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C543		ELECTROLYTIC CAP. 100μF/25V M H7	CE1EMASSL101
C545		CHIP CERAMIC CAP. F Z 0.1μF/25V or	CHE1EZB0F104
		CHIP CERAMIC CAP. F Z 0.1μF/50V	CHE1JZB0F104
C548	B,C,D,E	CERAMIC CAP.(AX) Y M 0.01μF/16V	CDA1CMT0Y103
C549		CERAMIC CAP.(AX) F Z 0.022μF/25V	CDA1EZT0F223
C551		CHIP CERAMIC CAP. F Z 0.1μF/25V or	CHE1EZB0F104
		CHIP CERAMIC CAP. F Z 0.1μF/50V	CHE1JZB0F104
C552	D,E	CERAMIC CAP.(AX) B J 1000pF/50V or	CDA1JJT0B102
	D,E	CERAMIC CAP.(AX) B K 1000pF/50V	CDA1JKT0B102
C553	B,C,D,E	CERAMIC CAP.(AX) B J 1000pF/50V or	CDA1JJT0B102
	B,C,D,E	CERAMIC CAP.(AX) B K 1000pF/50V	CDA1JKT0B102
C554		CERAMIC CAP.(AX) F Z 0.022μF/25V	CDA1EZT0F223
C555		CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C557		CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JJBSL270
C563		CERAMIC CAP.(AX) F Z 0.022μF/25V	CDA1EZT0F223
C565	A,B,C	CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C565	D,E	PCB JUMPER D0.6-P5.0	JW5.0T
C568		CERAMIC CAP.(AX) Y M 0.01μF/16V	CDA1CMT0Y103
C571		CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C702		CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C704		ELECTROLYTIC CAP. 100μF/6.3V M	CE0KMASDL101
C705		CERAMIC CAP. YV Z 0.01μF/50V or	CCD1JZSYV103
		CERAMIC CAP. F Z 0.01μF/50V	CCD1JZS0F103
C707		ELECTROLYTIC CAP. 4.7μF/25V M	CE1EMASDL4R7
C708	A	SEMICONDUCTOR CAP. SR K 0.039μF/25V or	CDA1EKS0X393
	A	SEMICONDUCTOR CAP. SR K 0.039μF/25V	12Y2393S
C709		ELECTROLYTIC CAP. 0.22μF/50V M	CE1JMASDLR22
C710		ELECTROLYTIC CAP. 10μF/16V M NP	CP1CMASNC100
C711		CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C712		CERAMIC CAP.(AX) B J 220pF/50V or	CCA1JJT0B221
		CERAMIC CAP.(AX) B K 220pF/50V	CCA1JKT0B221
C851		CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C853		CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220

Ref. No.	Mark	Description	Part No.
C854		CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C855		ELECTROLYTIC CAP. 1μF/50V M	CE1JMASDL010
C856		CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JJBSL221
C857		ELECTROLYTIC CAP. 47μF/6.3V M	CE0KMASDL470
C859		CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C951	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/50V M	CE1JMASDL4R7
C952	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/50V M	CE1JMASDL4R7
C954	B,C,D,E	ELECTROLYTIC CAP. 47μF/16V M	CE1CMASDL470
C955	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/50V M	CE1JMASDL4R7
C956	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/50V M	CE1JMASDL4R7
C957	B,C,D,E	ELECTROLYTIC CAP. 10μF/16V M	CE1CMASDL100
C958	B,C,D,E	ELECTROLYTIC CAP. 0.47μF/50V M LL	CE1JMASLLR47
C959	B,C,D,E	CHIP CERAMIC CAP. B K 1200pF/50V	CHE1JKB0B122
C960	B,C,D,E	CHIP CERAMIC CAP. B K 5600pF/50V	CHE1JKB0B562
C961	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/50V M	CE1JMASDL4R7
C962	B,C,D,E	ELECTROLYTIC CAP. 1μF/50V M	CE1JMASDL010
C963	B,C,D,E	ELECTROLYTIC CAP. 10μF/16V M	CE1CMASDL100
C964	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/35V M LL	CE1GMASLL4R7
C965	B,C,D,E	ELECTROLYTIC CAP. 3.3μF/50V M LL	CE1JMASLL3R3
C966	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/50V M	CE1JMASDL4R7
C967	B,C,D,E	FILM CAP.(P) 0.047μF/50V J or	CMA1JJS00473
	B,C,D,E	FILM CAP.(P) 0.047μF/50V J TV or	CMB1JJS00473
	B,C,D,E	FILM CAP.(P) 0.047μF/50V J	2254473S
C968	B,C,D,E	FILM CAP.(P) 0.0027μF/50V J or	CMA1JJS00272
	B,C,D,E	FILM CAP.(P) 0.0027μF/50V J TV or	CMB1JJS00272
	B,C,D,E	FILM CAP(P) 0.0027μF/50V J	2254272S
C980	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/50V M	CE1JMASDL4R7
C981	B,C,D,E	ELECTROLYTIC CAP. 4.7μF/50V M	CE1JMASDL4R7
		CONNECTORS	
CN501		CABLE CONNECTOR, 2P TMC-E02X-A1	JCTMC02TG001
CN502		FFC CONNECTOR BASE, TOP 17P 9604S-17C	JC04J17ER002
CN503		CONNECTOR, 8P TMC-J08P-A1	J3TMA08TG002
CN505	A	FFC CONNECTOR BASE, TOP 6P 9604S-06C	JC04J06ER002
CN505	B,C,D,E	FFC CONNECTOR BASE, TOP 9P 9604S-09C	JC04J09ER002
CN507		STRAIGHT PIN HEADER, 3P IMSA-9110B-03	J391C03ER001
		DIODES	
D001		RECTIFIER DIODE 1N4005 or	NDQZ001N4005
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D002		RECTIFIER DIODE 1N4005 or	NDQZ001N4005
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D003		RECTIFIER DIODE 1N4005 or	NDQZ001N4005
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D004		RECTIFIER DIODE 1N4005 or	NDQZ001N4005
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D005		RECTIFIER DIODE BA158 or	NDQZ000BA158
		RECTIFIER DIODE BA159 or	NDQZ000BA159
		RECTIFIER DIODE ERA22-10	QDPZ0ERA2210
D006		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D007		PCB JUMPER D0.6-P5.0	JW5.0T
D008		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D012	A,B,C	RECTIFIER DIODE BA157 or	NDQZ000BA157
	A,B,C	FAST RECOVERY DIODE ERA18-04	QDPZ0ERA1804
D013		RECTIFIER DIODE BA157 or	NDQZ000BA157
		FAST RECOVERY DIODE ERA18-04	QDPZ0ERA1804
D015		FAST RECOVERY DIODE ERB32-01	QDPZ0ERB3201
D016	A	SCHOTTKY BARRIER DIODE ERB81-004 or	AERB81004***
	A	SCHOTTKY BARRIER DIODE SB140	NDQZ000SB140

Ref. No.	Mark	Description	Part No.
D016	B,C,D,E	SCHOTTKY BARRIER DIODE SB340	NDQZ000SB340
D017	A,B,C	FAST RECOVERY DIODE ERA18-04V5	QDTZ0ERA1804
D018		ZENER DIODE MTZJT-779.1C	QDTC0MTZJ9R1
D051		PCB JUMPER D0.6-P10.0	JW10.0T
D052		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D053		ZENER DIODE MTZJT-775.6C	QDTC0MTZJ5R6
D055		RECTIFIER DIODE 1N4005 or	NDQZ001N4005
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D057		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D058		ZENER DIODE MTZJT-775.6A	QDTA0MTZJ5R6
D059	A,B,C	ZENER DIODE MTZJT-776.8A	QDTA0MTZJ6R8
D060		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D301		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D302		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D304		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D391		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D501		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D502		PCB JUMPER D0.6-P5.0	JW5.0T
D527		SWITCHING DIODE 1SS254 T-77 or	A1SS254T77**
		SWITCHING DIODE 1N4148 or	NDTZ001N4148
		SWITCHING DIODE 1SS133(T-77)	QDTZ001SS133
D555		LED SIR-56ST3F-M or	QPQM0S1R56ST
		LED SIR-56ST3F-N	QPQN0S1R56ST
		LED TYPE (A)	
D595	D,E	LED(RED) LTL-4211N or	NPQZLTL4211N
D596	D,E	LED(RED) LTL-4211N or	NPQZLTL4211N
D597	D,E	LED(GREEN) LTL-4231N or	NPQZLTL4231N
D598	D,E	LED(RED) LTL-4211N or	NPQZLTL4211N
D599	D,E	LED(GREEN) LTL-4231N	NPQZLTL4231N
		LED TYPE (B)	
D595	D,E	LED(RED) LT6311G-41 or	NPQZ0LT6311G
D596	D,E	LED(RED) LT6311G-41 or	NPQZ0LT6311G
D597	D,E	LED(GREEN) LT6321-41 or	NPQZ00LT6321
D598	D,E	LED(RED) LT6311G-41 or	NPQZ0LT6311G
D599	D,E	LED(GREEN) LT6321-41	NPQZ00LT6321
		LED TYPE (C)	
D595	D,E	LED(RED) L-934HD or	NP4Z00L934HD
D596	D,E	LED(RED) L-934HD or	NP4Z00L934HD
D597	D,E	LED(GREEN) L-934GD or	NP4Z00L934GD
D598	D,E	LED(RED) L-934HD or	NP4Z00L934HD
D599	D,E	LED(GREEN) L-934GD	NP4Z00L934GD
D701		ZENER DIODE MTZJT-7733D	QDTD00MTZJ33
		ICS	
IC001 ⚠		PHOTOCOUPLER LTV-817B-F or	NPEB0LTV817F
⚠		PHOTOCOUPLER LTV-817C-F or	NPEC0LTV817F
⚠		PHOTOCOUPLER PS2501-1D or	QPED0PS25011
⚠		PHOTOCOUPLER PS2501-1H or	QPEH0PS25011
⚠		PHOTO COUPLER PS2501-1L or	QPEL0PS25011
⚠		PHOTO COUPLER PS2501-1M or	QPEM0PS25011

Ref. No.	Mark	Description	Part No.
⚠		PHOTOCOUPLER PS2501-1W or	QPEW0PS25011
⚠		PHOTOCOUPLER PC-17T1	QPE100PC17T1
IC002		IC KIA431 or	NSZLA0ZJY001
		IC KA431Z or	NSZLA0ZSM001
		IC AN1431T-(NSC)	QSBLA0ZMS001
IC301		IC:Y/C/A LA71070M or	QSBLA0RSY077
		IC:Y/C/A LA71073M or	QSBLA0RSY080
		IC:Y/C/A LA71075M or	QSBLA0RSY083
		IC:Y/C/A LA71077M	QSBLA0RSY084
IC451	B,C,D,E	IC:HIFI LA72638M	QSMLA0RSY033
IC501	A,B,E	MICROCONTROLLER 16BIT M37779M5H211GP	QSMQB0RMB222
IC501	C,D	MICROCONTROLLER 16BIT M37779M9H300GP	QSMQA0RMB224
IC505	C,D	IC:MEMORY AT24C01A-10SC or	NSMMA0SAZ011
	C,D	IC:MEMORY BR24C01AF	QSMMA0SRM002
IC507		IC TA7291S	14LW342
IC851		IC, ON SCREEN LC74723-9701	QSMGA0SSY017
IC901	B,C,D,E	IC CXA2064M	QSBLA0SSN030
		COILS	
L001 ⚠		LINE FILTER 33MH 110-TXH-030X or	LLBG00ZF8002
⚠		LINE FILTER 33MH 53229 or	LLBG00ZKT001
⚠		LINE FILTER 33MH LF002 or	LLBG00ZLH002
⚠		LINE FILTER TLF12UA303W0R4	LLBG00ZTU010
L002		BEAD CORE HF70BB3.5X10X1.3 or	XL03010TE001
		BEAD CORE B16 RH 3.5X10X1.3	XL03010XM001
L003	A,B,C	BEAD CORE HF70BB4.1X3X2 or	XL03003TE001
	A,B,C	BEAD CORE B16 RH 3.5X3X1.3	XL03003XM002
L004		BEAD CORE HF70BB4.1X3X2 or	XL03003TE001
		BEAD CORE B16 RH 3.5X3X1.3	XL03003XM002
L007		BEAD CORE HF70BB4.1X3X2 or	XL03003TE001
		BEAD CORE B16 RH 3.5X3X1.3	XL03003XM002
L008		CHOKE COIL 47µH-K or	LLBD00PKV004
		CHOKE COIL 47µH-K	LLBD00PKV005
L009		CHOKE COIL 47µH-K or	LLBD00PKV004
		CHOKE COIL 47µH-K	LLBD00PKV005
L010		BEAD CORE HF70BB3.5X10X1.3 or	XL03010TE001
		BEAD CORE B16 RH 3.5X10X1.3	XL03010XM001
L251		PCB JUMPER D0.6-P5.0	JW5.0T
L302		INDUCTOR 22µH-K-26T or	LLAXKATTU220
		INDUCTOR 22µH-K-26T	LLAXKDTKA220
L303		PCB JUMPER D0.6-P5.0	JW5.0T
L306		CHOKE COIL 47µH-K or	LLBD00PKV004
		CHOKE COIL 47µH-K	LLBD00PKV005
L421		CHOKE COIL 47µH-K or	LLBD00PKV004
		CHOKE COIL 47µH-K	LLBD00PKV005
L501		INDUCTOR 270µH-J-26T or	LLAXJATTU271
		INDUCTOR 270µH-K-26T	LLAXKDTKA271
L502	A,B,C	INDUCTOR 100µH-K-26T or	LLAXKATTU101
	A,B,C	INDUCTOR 100µH-K-26T	LLAXKDTKA101
L502	D,E	PCB JUMPER D0.6-P5.0	JW5.0T
L503		PCB JUMPER D0.6-P5.0	JW5.0T
L504		INDUCTOR 12µH-K-26T or	LLAXKATTU120
		INDUCTOR 12µH-K-26T	LLAXKDTKA120
L701		INDUCTOR 100µH-K-26T or	LLAXKATTU101
		INDUCTOR 100µH-K-26T	LLAXKDTKA101
L702		PCB JUMPER D0.6-P5.0	JW5.0T
L703		PCB JUMPER D0.6-P5.0	JW5.0T
L851		INDUCTOR 18µH-J-26T or	LLAXJATTU180
		INDUCTOR 18µH-J-26T	LLAXJDTKA180
L853		PCB JUMPER D0.6-P5.0	JW5.0T
L854		INDUCTOR 4.7µH-K-26T or	LLAXKATTU4R7
		INDUCTOR 4.7µH-K-26T	LLAXKDTKA4R7
		TRANSISTORS	
Q001 ⚠		TRANSISTOR KSC5020(R) or	NQQR0KSC5020
⚠		TRANSISTOR KSC5020(O) or	NQQ00KSC5020

Ref. No.	Mark	Description	Part No.
⚠		TRANSISTOR 2SC4953 or	QQQZ02SC4953
⚠		TRANSISTOR 2SC4242-01	QQZZSC424201
Q002 ⚠		TRANSISTOR KTC3203(Y) or	NQSY0KTC3203
⚠		TRANSISTOR 2SC2120(Y)	QQSY02SC2120
Q053		TRANSISTOR KTA1271(Y) or	NQSY0KTA1271
		TRANSISTOR 2SA950(Y)	Q2SA950YTPE2
Q054		TRANSISTOR 2SC1740(Q) or	C1740QZ
		TRANSISTOR 2SC1740(R) or	C1740RZ
		TRANSISTOR KTC3199(Y) or	NQSY0KTC3199
		TRANSISTOR KTC3199(GR) or	NQS10KTC3199
		TRANSISTOR 2SC2785(F) or	QQSF02SC2785
		TRANSISTOR 2SC2785(H) or	QQSH02SC2785
		TRANSISTOR 2SC2785(J) or	QQSJ02SC2785
		TRANSISTOR 2SC1815-Y(TPE2) or	QQSY02SC1815
		TRANSISTOR 2SC1815-GR(TPE2)	QQS102SC1815
Q055		RES. BUILT-IN TRANSISTOR DTA124ES or	A124ESZ
		RES. BUILT-IN TRANSISTOR 2SA1346 or	A1346Z
		RES. BUILT-IN TRANSISTOR KRA103M	NQSZ0KRA103M
Q057		TRANSISTOR 2SB926(S)	QQSS002SB926
Q058		RES. BUILT-IN TRANSISTOR KRC101M	NQSZ0KRC101M
Q301		TRANSISTOR KTA1267(Y) or	NQSY0KTA1267
		TRANSISTOR KTA1267(GR) or	NQS10KTA1267
		TRANSISTOR 2SA608(E) or	QQSESA608SPA
		TRANSISTOR 2SA608(F) or	QQSFSA608SPA
		TRANSISTOR 2SA1175(F) or	QQSF02SA1175
		TRANSISTOR 2SA1175(H) or	QQSH02SA1175
		TRANSISTOR 2SA1175(J) or	QQSJ02SA1175
		TRANSISTOR 2SA933AS(Q) or	QQSQ2SA933AS
		TRANSISTOR 2SA933AS(R)	QQSR2SA933AS
Q302		TRANSISTOR KTC3193(Y) or	NQSY0KTC3193
		TRANSISTOR 2SC2058(Q)	QQSQ02SC2058
Q303		TRANSISTOR KTC3193(Y) or	NQSY0KTC3193
		TRANSISTOR 2SC2058(Q)	QQSQ02SC2058
Q304		RES. BUILT-IN TRANSISTOR DTC124ES or	C124ESZ
		RES. BUILT-IN TRANSISTOR KRC103M	NQSZ0KRC103M
Q305		RES. BUILT-IN TRANSISTOR DTC124ES or	C124ESZ
		RES. BUILT-IN TRANSISTOR KRC103M	NQSZ0KRC103M
Q391		TRANSISTOR KTA1266(GR) or	NQS40KTA1266
		TRANSISTOR 2SA933AS(S) or	QQSS2SA933AS
		TRANSISTOR 2SA1015-GR(TPE2)	QQS102SA1015
Q421		TRANSISTOR KTA1266(GR) or	NQS40KTA1266
		TRANSISTOR 2SA933AS(S) or	QQSS2SA933AS
		TRANSISTOR 2SA1015-GR(TPE2)	QQS102SA1015
Q422		TRANSISTOR KTC3203(Y) or	NQSY0KTC3203
		TRANSISTOR 2SC2120(Y)	QQSY02SC2120
Q423		TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
		TRANSISTOR 2SC3331(U)	QSC3331UNPAA
Q424		TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
		TRANSISTOR 2SC3331(U)	QSC3331UNPAA
Q425		RES. BUILT-IN TRANSISTOR DTA124ES or	A124ESZ
		RES. BUILT-IN TRANSISTOR 2SA1346 or	A1346Z
		RES. BUILT-IN TRANSISTOR KRA103M	NQSZ0KRA103M
Q503		PHOTO TRANSISTOR ST-319R2-B	QP4B0ST319R2
Q504		PHOTO TRANSISTOR ST-319R2-B	QP4B0ST319R2
Q511		TRANSISTOR KTC3199(BL) or	NQS50KTC3199
		TRANSISTOR 2SC2785(K) or	QQSK02SC2785
		TRANSISTOR 2SC1815-BL(TPE2)	QQS202SC1815

Ref. No.	Mark	Description	Part No.
Q514		PHOTO TRANSISTOR ST-319R2-B	QP4B0ST319R2
Q515		TRANSISTOR 2SC1740(Q) or	C1740QZ
		TRANSISTOR 2SC1740(R) or	C1740RZ
		TRANSISTOR KTC3199(Y) or	NQSY0KTC3199
		TRANSISTOR KTC3199(GR) or	NQS10KTC3199
		TRANSISTOR 2SC2785(F) or	QQSF02SC2785
		TRANSISTOR 2SC2785(H) or	QQSH02SC2785
		TRANSISTOR 2SC2785(J) or	QQSJ02SC2785
		TRANSISTOR 2SC1815-Y(TPE2) or	QQSY02SC1815
		TRANSISTOR 2SC1815-GR(TPE2)	QQS102SC1815
		RESISTORS	
J23		CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
		CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R001 ⚠		CARBON RES. 1/2W J 3.3M Ω or	RCX2335A4001
⚠		CARBON RES. 1/2W J 3.3M Ω	RCX2335KA013
R002		PCB JUMPER D0.6-P15.0	JW15.0T
R004		CARBON RES. 1/4W J 150k Ω or	RCX4JATZ0154
		CARBON RES. 1/6W J 150k Ω	RCX6JATZ0154
R005		CARBON RES. 1/4W J 150k Ω or	RCX4JATZ0154
		CARBON RES. 1/6W J 150k Ω	RCX6JATZ0154
R006		PCB JUMPER D0.6-P5.0	JW5.0T
R007		PCB JUMPER D0.6-P5.0	JW5.0T
R008		FIXED METAL OXIDE FILM RES. 1W J 120 Ω or	RN01121HH007
		FIXED METAL OXIDE FILM RES. 1W J 120 Ω	RN01121KE009
R011		FIXED METAL OXIDE FILM RES. 3W J 33k Ω or	RN03333HH018
		FIXED METAL OXIDE FILM RES. 3W J 33k Ω	RN03333KE009
R012		CARBON RES. 1/4W J 22k Ω or	RCX4JATZ0223
		CARBON RES. 1/6W J 22k Ω	RCX6JATZ0223
R014		FIXED METAL OXIDE FILM RES. 1W J 1.1 Ω or	RN011R1HH007
		FIXED METAL OXIDE FILM RES. 1W J 1.1 Ω	RN011R1KE009
R015		CARBON RES. 1/4W J 1.5k Ω or	RCX4JATZ0152
		CARBON RES. 1/6W J 1.5k Ω	RCX6JATZ0152
R016		CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
		CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R021	A,B,C	CARBON RES. 1/4W J 56k Ω or	RCX4JATZ0563
	A,B,C	CARBON RES. 1/6W J 56k Ω	RCX6JATZ0563
R022		CARBON RES. 1/4W J 390 Ω or	RCX4JATZ0391
		CARBON RES. 1/6W J 390 Ω	RCX6JATZ0391
R023		CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
		CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R024		CARBON RES. 1/4W J 820 Ω or	RCX4JATZ0821
		CARBON RES. 1/6W J 820 Ω	RCX6JATZ0821
R025		CARBON RES. 1/4W G 2.4k Ω or	RCX4GATZ0242
		CARBON RES. 1/6W G 2.4k Ω	RCX6GATZ0242
R026		CARBON RES. 1/4W G 1.5k Ω or	RCX4GATZ0152
		CARBON RES. 1/6W G 1.5k Ω	RCX6GATZ0152
R027	A	CARBON RES. 1/4W J 39k Ω or	RCX4JATZ0393
	A	CARBON RES. 1/6W J 39k Ω	RCX6JATZ0393
R027	B,C,D,E	CARBON RES. 1/4W J 47k Ω or	RCX4JATZ0473
	B,C,D,E	CARBON RES. 1/6W J 47k Ω	RCX6JATZ0473
R051	A,B,C	CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R052	A,B,C	CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R056		CARBON RES. 1/4W J 47k Ω or	RCX4JATZ0473
		CARBON RES. 1/6W J 47k Ω	RCX6JATZ0473
R057		CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
		CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R058		CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
		CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R059		CARBON RES. 1/4W J 15k Ω or	RCX4JATZ0153
		CARBON RES. 1/6W J 15k Ω	RCX6JATZ0153
R062	A,B,C	CARBON RES. 1/4W J 5.6 Ω	RCX4JATZ05R6

Ref. No.	Mark	Description	Part No.
R063	A,B,C	CARBON RES. 1/4W J 5.6 Ω	RCX4JATZ05R6
R064		CARBON RES. 1/4W J 22k Ω or	RCX4JATZ0223
		CARBON RES. 1/6W J 22k Ω	RCX6JATZ0223
R066		CHIP RES. 1/10W J 22k Ω or	RRXAJB6Z0223
		CHIP RES. 1/8W J 22k Ω	RRX8JB6Z0223
R068		CARBON RES. 1/4W J 47k Ω or	RCX4JATZ0473
		CARBON RES. 1/6W J 47k Ω	RCX6JATZ0473
R069		CARBON RES. 1/4W J 220 Ω	RCX4JATZ0221
R070	A,B,C	CARBON RES. 1/4W J 5.6 Ω	RCX4JATZ05R6
R074		CHIP RES. 1/10W J 33k Ω or	RRXAJB6Z0333
		CHIP RES. 1/8W J 33k Ω	RRX8JB6Z0333
R253	D,E	CARBON RES. 1/6W J 330 Ω	RCX6JATZ0331
R253		CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R254		CARBON RES. 1/4W J 560 Ω or	RCX4JATZ0561
		CARBON RES. 1/6W J 560 Ω	RCX6JATZ0561
R255		CHIP RES. 1/10W J 47k Ω or	RRXAJB6Z0473
		CHIP RES. 1/8W J 47k Ω	RRX8JB6Z0473
R256	A	CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
	A	CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R256	B,C,D,E	CARBON RES. 1/4W J 2.7k Ω or	RCX4JATZ0272
	B,C,D,E	CARBON RES. 1/6W J 2.7k Ω	RCX6JATZ0272
R301		CARBON RES. 1/4W J 390k Ω or	RCX4JATZ0394
		CARBON RES. 1/6W J 390k Ω	RCX6JATZ0394
R302		CHIP RES. 1/10W J 270 Ω or	RRXAJB6Z0271
		CHIP RES. 1/8W J 270 Ω	RRX8JB6Z0271
R303		CARBON RES. 1/4W J 15k Ω or	RCX4JATZ0153
		CARBON RES. 1/6W J 15k Ω	RCX6JATZ0153
R304		CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
		CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R305		CHIP RES. 1/10W J 1.5k Ω or	RRXAJB6Z0152
		CHIP RES. 1/8W J 1.5k Ω	RRX8JB6Z0152
R306		CARBON RES. 1/4W J 15k Ω or	RCX4JATZ0153
		CARBON RES. 1/6W J 15k Ω	RCX6JATZ0153
R307		CARBON RES. 1/4W J 33k Ω or	RCX4JATZ0333
		CARBON RES. 1/6W J 33k Ω	RCX6JATZ0333
R308		CARBON RES. 1/4W J 1.8k Ω or	RCX4JATZ0182
		CARBON RES. 1/6W J 1.8k Ω	RCX6JATZ0182
R309		CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
		CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R310		CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
		CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R311		CHIP RES. 1/10W J 1.8k Ω or	RRXAJB6Z0182
		CHIP RES. 1/8W J 1.8k Ω	RRX8JB6Z0182
R312		CHIP RES. 1/10W J 1.8k Ω or	RRXAJB6Z0182
		CHIP RES. 1/8W J 1.8k Ω	RRX8JB6Z0182
R313		CHIP RES. 1/10W J 680k Ω or	RRXAJB6Z0684
		CHIP RES. 1/8W J 680k Ω	RRX8JB6Z0684
R314		CHIP RES. 1/10W J 2.2k Ω or	RRXAJB6Z0222
		CHIP RES. 1/8W J 2.2k Ω	RRX8JB6Z0222
R315	D,E	CARBON RES. 1/6W J 330 Ω	RCX6JATZ0331
R315		CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R316		CHIP RES. 1/10W J 8.2k Ω or	RRXAJB6Z0822
		CHIP RES. 1/8W J 8.2k Ω	RRX8JB6Z0822
R323		CARBON RES. 1/4W J 3.9k Ω or	RCX4JATZ0392
		CARBON RES. 1/6W J 3.9k Ω	RCX6JATZ0392
R324		CARBON RES. 1/4W J 33k Ω or	RCX4JATZ0333
		CARBON RES. 1/6W J 33k Ω	RCX6JATZ0333
R326		CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
		CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R327		CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
		CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R328		CHIP RES. 1/10W J 100k Ω or	RRXAJB6Z0104
		CHIP RES. 1/8W J 100k Ω	RRX8JB6Z0104
R329		CARBON RES. 1/4W J 100k Ω or	RCX4JATZ0104
		CARBON RES. 1/6W J 100k Ω	RCX6JATZ0104
R330		CARBON RES. 1/4W J 100k Ω or	RCX4JATZ0104

Ref. No.	Mark	Description	Part No.
		CARBON RES. 1/6W J 100k Ω	RCX6JATZ0104
R332		CHIP RES. 1/10W J 3.3M Ω or	RRXAJB6Z0335
		CHIP RES. 1/8W J 3.3M Ω	RRX8JB6Z0335
R333		CARBON RES. 1/4W J 100k Ω or	RCX4JATZ0104
		CARBON RES. 1/6W J 100k Ω	RCX6JATZ0104
R334		CHIP RES. 1/10W J 100k Ω or	RRXAJB6Z0104
		CHIP RES. 1/8W J 100k Ω	RRX8JB6Z0104
R335		CHIP RES. 1/10W J 12k Ω or	RRXAJB6Z0123
		CHIP RES. 1/8W J 12k Ω	RRX8JB6Z0123
R355		CHIP RES. 1/10W J 820 Ω or	RRXAJB6Z0821
		CHIP RES. 1/8W J 820 Ω	RRX8JB6Z0821
R356		CARBON RES. 1/4W J 3.3k Ω or	RCX4JATZ0332
		CARBON RES. 1/6W J 3.3k Ω	RCX6JATZ0332
R391		CARBON RES. 1/4W J 560 Ω or	RCX4JATZ0561
		CARBON RES. 1/6W J 560 Ω	RCX6JATZ0561
R392		CARBON RES. 1/4W J 560 Ω or	RCX4JATZ0561
		CARBON RES. 1/6W J 560 Ω	RCX6JATZ0561
R393		CHIP RES. 1/10W J 150 Ω or	RRXAJB6Z0151
		CHIP RES. 1/8W J 150 Ω	RRX8JB6Z0151
R394		CARBON RES. 1/4W J 10 Ω or	RCX4JATZ0100
		CARBON RES. 1/6W J 10 Ω	RCX6JATZ0100
R401		CHIP RES. 1/10W J 6.8k Ω or	RRXAJB6Z0682
		CHIP RES. 1/8W J 6.8k Ω	RRX8JB6Z0682
R402		CARBON RES. 1/4W J 2.7k Ω or	RCX4JATZ0272
		CARBON RES. 1/6W J 2.7k Ω	RCX6JATZ0272
R403		CHIP RES. 1/10W J 6.8k Ω or	RRXAJB6Z0682
		CHIP RES. 1/8W J 6.8k Ω	RRX8JB6Z0682
R404		CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
		CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R405		CARBON RES. 1/4W J 150 Ω or	RCX4JATZ0151
		CARBON RES. 1/6W J 150 Ω	RCX6JATZ0151
R406		CHIP RES. 1/10W J 22k Ω or	RRXAJB6Z0223
		CHIP RES. 1/8W J 22k Ω	RRX8JB6Z0223
R407		CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
		CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R408	A	CHIP RES. 1/10W J 27k Ω or	RRXAJB6Z0273
	A	CHIP RES. 1/8W J 27k Ω	RRX8JB6Z0273
R409	A	CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
	A	CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R410		CHIP RES. 1/10W J 2.2M Ω or	RRXAJB6Z0225
		CHIP RES. 1/8W J 2.2M Ω	RRX8JB6Z0225
R411	A	CARBON RES. 1/4W J 27k Ω or	RCX4JATZ0273
	A	CARBON RES. 1/6W J 27k Ω	RCX6JATZ0273
R412	A	CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
	A	CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R413	A	CARBON RES. 1/4W J 27k Ω or	RCX4JATZ0273
	A	CARBON RES. 1/6W J 27k Ω	RCX6JATZ0273
R413	B,C,D,E	CARBON RES. 1/4W J 8.2k Ω or	RCX4JATZ0822
	B,C,D,E	CARBON RES. 1/6W J 8.2k Ω	RCX6JATZ0822
R414	A	CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
	A	CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R414	B,C,D,E	CHIP RES. 1/10W J 8.2k Ω or	RRXAJB6Z0822
	B,C,D,E	CHIP RES. 1/8W J 8.2k Ω	RRX8JB6Z0822
R415		CARBON RES. 1/4W J 8.2k Ω or	RCX4JATZ0822
		CARBON RES. 1/6W J 8.2k Ω	RCX6JATZ0822
R416		CHIP RES. 1/10W J 12k Ω or	RRXAJB6Z0123
		CHIP RES. 1/8W J 12k Ω	RRX8JB6Z0123
R417		CARBON RES. 1/4W J 330k Ω or	RCX4JATZ0334
		CARBON RES. 1/6W J 330k Ω	RCX6JATZ0334
R418		CHIP RES. 1/10W J 2.2k Ω or	RRXAJB6Z0222
		CHIP RES. 1/8W J 2.2k Ω	RRX8JB6Z0222
R419		CARBON RES. 1/4W J 3.3k Ω or	RCX4JATZ0332
		CARBON RES. 1/6W J 3.3k Ω	RCX6JATZ0332
R421		PCB JUMPER D0.6-P5.0	JW5.0T
R422		CHIP RES. 1/10W J 22k Ω or	RRXAJB6Z0223
		CHIP RES. 1/8W J 22k Ω	RRX8JB6Z0223

Ref. No.	Mark	Description	Part No.
R423		CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
		CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R424		CARBON RES. 1/4W J 47k Ω or	RCX4JATZ0473
		CARBON RES. 1/6W J 47k Ω	RCX6JATZ0473
R425		CARBON RES. 1/4W J 100 Ω or	RCX4JATZ0101
		CARBON RES. 1/6W J 100 Ω	RCX6JATZ0101
R426		CARBON RES. 1/4W J 820 Ω or	RCX4JATZ0821
		CARBON RES. 1/6W J 820 Ω	RCX6JATZ0821
R427		CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
		CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R428		CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
		CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R429		CHIP RES. 1/10W J 2.2k Ω or	RRXAJB6Z0222
		CHIP RES. 1/8W J 2.2k Ω	RRX8JB6Z0222
R462	B,C,D,E	CHIP RES. 1/10W J 8.2k Ω or	RRXAJB6Z0822
	B,C,D,E	CHIP RES. 1/8W J 8.2k Ω	RRX8JB6Z0822
R463	B,C,D,E	CHIP RES. 1/10W J 47k Ω or	RRXAJB6Z0473
	B,C,D,E	CHIP RES. 1/8W J 47k Ω	RRX8JB6Z0473
R466	B,C,D,E	CARBON RES. 1/4W J 47k Ω or	RCX4JATZ0473
	B,C,D,E	CARBON RES. 1/6W J 47k Ω	RCX6JATZ0473
R467	B,C,D,E	CHIP RES. 1/10W J 8.2k Ω or	RRXAJB6Z0822
	B,C,D,E	CHIP RES. 1/8W J 8.2k Ω	RRX8JB6Z0822
R468	B,C,D,E	CHIP RES. 1/10W J 12k Ω or	RRXAJB6Z0123
	B,C,D,E	CHIP RES. 1/8W J 12k Ω	RRX8JB6Z0123
R469	B,C,D,E	CARBON RES. 1/4W J 4.7k Ω or	RCX4JATZ0472
	B,C,D,E	CARBON RES. 1/6W J 4.7k Ω	RCX6JATZ0472
R470	B,C,D,E	CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
	B,C,D,E	CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R471	B,C,D,E	CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
	B,C,D,E	CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R472	B,C,D,E	CHIP RES. 1/10W J 47k Ω or	RRXAJB6Z0473
	B,C,D,E	CHIP RES. 1/8W J 47k Ω	RRX8JB6Z0473
R473	B,C,D,E	CARBON RES. 1/4W J 8.2k Ω or	RCX4JATZ0822
	B,C,D,E	CARBON RES. 1/6W J 8.2k Ω	RCX6JATZ0822
R474	B,C,D,E	CHIP RES. 1/10W J 47k Ω or	RRXAJB6Z0473
	B,C,D,E	CHIP RES. 1/8W J 47k Ω	RRX8JB6Z0473
R475	B,C,D,E	CHIP RES. 1/10W J 8.2k Ω or	RRXAJB6Z0822
	B,C,D,E	CHIP RES. 1/8W J 8.2k Ω	RRX8JB6Z0822
R477	B,C,D,E	CARBON RES. 1/4W J 470 Ω or	RCX4JATZ0471
	B,C,D,E	CARBON RES. 1/6W J 470 Ω	RCX6JATZ0471
R478	B,C,D,E	CARBON RES. 1/4W J 3.9k Ω or	RCX4JATZ0392
	B,C,D,E	CARBON RES. 1/6W J 3.9k Ω	RCX6JATZ0392
R479	B,C,D,E	PCB JUMPER D0.6-P5.0	JW5.0T
R480	B,C,D,E	PCB JUMPER D0.6-P5.0	JW5.0T
R481	B,C,D,E	PCB JUMPER D0.6-P5.0	JW5.0T
R501		PCB JUMPER D0.6-P5.0	JW5.0T
R502		CHIP RES. 1/10W J 220k Ω or	RRXAJB6Z0224
		CHIP RES. 1/8W J 220k Ω	RRX8JB6Z0224
R503		CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
		CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R506		PCB JUMPER D0.6-P5.0	JW5.0T
R507		CHIP RES. 1/10W J 39k Ω or	RRXAJB6Z0393
		CHIP RES. 1/8W J 39k Ω	RRX8JB6Z0393
R512		CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
		CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R513		CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
		CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R514		CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
		CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R522		CHIP RES. 1/10W J 100 Ω or	RRXAJB6Z0101
		CHIP RES. 1/8W J 100 Ω	RRX8JB6Z0101
R523		CARBON RES. 1/4W J 150 Ω or	RCX4JATZ0151
		CARBON RES. 1/6W J 150 Ω	RCX6JATZ0151
R524		CARBON RES. 1/4W J 150 Ω or	RCX4JATZ0151
		CARBON RES. 1/6W J 150 Ω	RCX6JATZ0151
R525		CARBON RES. 1/4W J 680k Ω or	RCX4JATZ0684

Ref. No.	Mark	Description	Part No.
		CARBON RES. 1/6W J 680k Ω	RCX6JATZ0684
R526		CHIP RES. 1/10W J 680k Ω or	RRXAJB6Z0684
		CHIP RES. 1/8W J 680k Ω	RRX8JB6Z0684
R529		CARBON RES. 1/4W J 100k Ω or	RCX4JATZ0104
		CARBON RES. 1/6W J 100k Ω	RCX6JATZ0104
R530	B,C,D,E	CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
	B,C,D,E	CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R531	C,D	CHIP RES. 1/10W J 1.5k Ω or	RRXAJB6Z0152
	C,D	CHIP RES. 1/8W J 1.5k Ω	RRX8JB6Z0152
R532	B,C,D,E	CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
	B,C,D,E	CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R537		CARBON RES. 1/4W J 4.7k Ω or	RCX4JATZ0472
		CARBON RES. 1/6W J 4.7k Ω	RCX6JATZ0472
R538		CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
		CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R539		CHIP RES. 1/10W J 820 Ω or	RRXAJB6Z0821
		CHIP RES. 1/8W J 820 Ω	RRX8JB6Z0821
R540		CHIP RES. 1/10W J 100k Ω or	RRXAJB6Z0104
		CHIP RES. 1/8W J 100k Ω	RRX8JB6Z0104
R541		CHIP RES. 1/10W J 47 Ω or	RRXAJB6Z0470
		CHIP RES. 1/8W J 47 Ω	RRX8JB6Z0470
R542		PCB JUMPER D0.6-P5.0	JW5.0T
R543		CHIP RES. 1/10W J 100k Ω or	RRXAJB6Z0104
		CHIP RES. 1/8W J 100k Ω	RRX8JB6Z0104
R544		FIXED METAL OXIDE FILM RES. 1W J 2.7 Ω or	RN012R7HH007
		FIXED METAL OXIDE FILM RES. 1W J 2.7 Ω	RN012R7KE009
R545		CHIP RES. 1/10W J 330k Ω or	RRXAJB6Z0334
		CHIP RES. 1/8W J 330k Ω	RRX8JB6Z0334
R546		CHIP RES. 1/10W J 10M Ω or	RRXAJB6Z0106
		CHIP RES. 1/8W J 10M Ω	RRX8JB6Z0106
R550		CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
		CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R553		CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
		CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R554		CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
		CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R555		CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
		CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R557		CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
		CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R558		CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
		CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R559		CARBON RES. 1/4W G 4.7k Ω or	RCX4GATZ0472
		CARBON RES. 1/6W G 4.7k Ω	RCX6GATZ0472
R560		PCB JUMPER D0.6-P5.0	JW5.0T
R562		CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
		CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R563		CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
		CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R565		PCB JUMPER D0.6-P5.0	JW5.0T
R566		CARBON RES. 1/4W J 4.7k Ω or	RCX4JATZ0472
		CARBON RES. 1/6W J 4.7k Ω	RCX6JATZ0472
R568		CARBON RES. 1/4W J 18k Ω or	RCX4JATZ0183
		CARBON RES. 1/6W J 18k Ω	RCX6JATZ0183
R569		PCB JUMPER D0.6-P5.0	JW5.0T
R571		PCB JUMPER D0.6-P5.0	JW5.0T
R572		PCB JUMPER D0.6-P5.0	JW5.0T
R585		CHIP RES. 1/10W J 1.5k Ω or	RRXAJB6Z0152
		CHIP RES. 1/8W J 1.5k Ω	RRX8JB6Z0152
R586		CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
		CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R587		CHIP RES. 1/10W J 1.2k Ω or	RRXAJB6Z0122
		CHIP RES. 1/8W J 1.2k Ω	RRX8JB6Z0122
R588		CHIP RES. 1/10W J 1.5k Ω or	RRXAJB6Z0152

Ref. No.	Mark	Description	Part No.
		CHIP RES. 1/8W J 1.5k Ω	RRX8JB6Z0152
R589		CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
		CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R595	D,E	CARBON RES. 1/4W J 680 Ω or	RCX4JATZ0681
	D,E	CARBON RES. 1/6W J 680 Ω	RCX6JATZ0681
R596	D,E	CARBON RES. 1/4W J 560 Ω or	RCX4JATZ0561
	D,E	CARBON RES. 1/6W J 560 Ω	RCX6JATZ0561
R597	D,E	CARBON RES. 1/4W J 150 Ω or	RCX4JATZ0151
	D,E	CARBON RES. 1/6W J 150 Ω	RCX6JATZ0151
R598	D,E	CARBON RES. 1/4W J 560 Ω or	RCX4JATZ0561
	D,E	CARBON RES. 1/6W J 560 Ω	RCX6JATZ0561
R599	D,E	CARBON RES. 1/4W J 150 Ω or	RCX4JATZ0151
	D,E	CARBON RES. 1/6W J 150 Ω	RCX6JATZ0151
R601	D,E	CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
	D,E	CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R602	A,B,C	CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
	A,B,C	CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R604		CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
		CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R606		CARBON RES. 1/4W J 4.7k Ω or	RCX4JATZ0472
		CARBON RES. 1/6W J 4.7k Ω	RCX6JATZ0472
R608		CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
		CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R609	A	CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
	A	CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R610	B,C,D,E	CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
	B,C,D,E	CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R701		CHIP RES. 1/10W J 220 Ω or	RRXAJB6Z0221
		CHIP RES. 1/8W J 220 Ω	RRX8JB6Z0221
R702		CARBON RES. 1/4W J 4.7k Ω or	RCX4JATZ0472
		CARBON RES. 1/6W J 4.7k Ω	RCX6JATZ0472
R703	A	CHIP RES. 1/10W J 47k Ω or	RRXAJB6Z0473
	A	CHIP RES. 1/8W J 47k Ω	RRX8JB6Z0473
R751		CHIP RES. 1/10W J 75 Ω or	RRXAJB6Z0750
		CHIP RES. 1/8W J 75 Ω	RRX8JB6Z0750
R756		CHIP RES. 1/10W J 75 Ω or	RRXAJB6Z0750
		CHIP RES. 1/8W J 75 Ω	RRX8JB6Z0750
R757		CHIP RES. 1/10W J 75 Ω or	RRXAJB6Z0750
		CHIP RES. 1/8W J 75 Ω	RRX8JB6Z0750
R852		CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
		CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R856		CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
		CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R857	D,E	CARBON RES. 1/6W J 330 Ω	RCX6JATZ0331
R857		CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R858		CHIP RES. 1/10W J 1M Ω or	RRXAJB6Z0105
		CHIP RES. 1/8W J 1M Ω	RRX8JB6Z0105
R901	B,C,D,E	PCB JUMPER D0.6-P5.0	JW5.0T
R951	B,C,D,E	METAL FILM RES. 1/4W F 68k Ω	RDC6802KA001
R952	B,C,D,E	CHIP RES. 1/10W J 100k Ω or	RRXAJB6Z0104
	B,C,D,E	CHIP RES. 1/8W J 100k Ω	RRX8JB6Z0104
R953	B,C,D,E	CHIP RES. 1/10W J 1M Ω or	RRXAJB6Z0105
	B,C,D,E	CHIP RES. 1/8W J 1M Ω	RRX8JB6Z0105
R954	B,C,D,E	CHIP RES. 1/10W J 3.9k Ω or	RRXAJB6Z0392
	B,C,D,E	CHIP RES. 1/8W J 3.9k Ω	RRX8JB6Z0392
R955	B,C,D,E	CHIP RES. 1/10W J 3.3k Ω or	RRXAJB6Z0332
	B,C,D,E	CHIP RES. 1/8W J 3.3k Ω	RRX8JB6Z0332
R976	B,C,D,E	CHIP RES. 1/10W J 47k Ω or	RRXAJB6Z0473
	B,C,D,E	CHIP RES. 1/8W J 47k Ω	RRX8JB6Z0473
R977	B,C,D,E	CARBON RES. 1/4W J 6.8k Ω or	RCX4JATZ0682
	B,C,D,E	CARBON RES. 1/6W J 6.8k Ω	RCX6JATZ0682
R978	B,C,D,E	CARBON RES. 1/4W J 47k Ω or	RCX4JATZ0473
	B,C,D,E	CARBON RES. 1/6W J 47k Ω	RCX6JATZ0473
R979	B,C,D,E	CARBON RES. 1/4W J 6.8k Ω or	RCX4JATZ0682
	B,C,D,E	CARBON RES. 1/6W J 6.8k Ω	RCX6JATZ0682
R980	B,C,D,E	CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103

Ref. No.	Mark	Description	Part No.
	B,C,D,E	CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R981	B,C,D,E	CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
	B,C,D,E	CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
		SWITCHES	
SW501		TACT SWITCH SKQSAF001A or	SST0101AL041
		TACT SWITCH KSM0614B	SST0101HH013
SW502		TACT SWITCH SKQSAF001A or	SST0101AL041
		TACT SWITCH KSM0614B	SST0101HH013
SW503		TACT SWITCH SKQSAF001A or	SST0101AL041
		TACT SWITCH KSM0614B	SST0101HH013
SW504		TACT SWITCH SKQSAF001A or	SST0101AL041
		TACT SWITCH KSM0614B	SST0101HH013
SW505		TACT SWITCH SKQSAF001A or	SST0101AL041
		TACT SWITCH KSM0614B	SST0101HH013
SW506		PUSH SWITCH SPPB61066A	SSP0102AL001
SW701		SLIDE SWITCH SK12D07VG5-L A	SSS0102LY003
		MISCELLANEOUS	
AC001 ⚠		AC CORD 9806190 or	WAC0172AS004
⚠		AC CORD LA-2145	WAC0172LW005
2B1	D,E	HOLDER, L.E.D.(U19)	0VM303546
2B2	A,B,C	HOLDER, F.I.P. 2	0VM407372
2B7		PLATE, EARTH(U19)	0VM409326
2B8		BUSH, LED(F)	0VM409508
2B9		BUSH, LED(E)	0VM408832
CR001 ⚠		GAP. G3.10D or	FAZ000LD6004
⚠		GAP. WSG-R-3.10	FAZ000LW1002
F001 ⚠		FUSE 1A/250V or	PAGA20CW3102
⚠		FUSE 1A/250V	PAGG20CAG102
FH001		FUSE HOLDER FH-V-03078-1 or	XH01Z00DK002
		FUSE HOLDER MSF-015	XH01Z00LY001
FH002		FUSE HOLDER FH-V-03078-1 or	XH01Z00DK002
		FUSE HOLDER MSF-015	XH01Z00LY001
FIP502	A,B,C	F.I.P. 4-MT-203G or	TVFD1C0FT031
	A,B,C	F.I.P. SVV-04SS07	TVFD1C0SM004
JK751	A	RCA JACK JPJ8011-01-430 or	JXRL030HD001
	A	RCA JACK MSP-282V-14 or	JXRL030LY001
	A	RCA JACK AV2-8.4-15	JXRL030RP001
JK751	B,C,D,E	RCA JACK JPJ4811-01-324 or	JXRL040HD002
	B,C,D,E	RCA JACK MSP-283V-B-324 or	JXRL040LY006
	B,C,D,E	RCA JACK AV3-25	JXRL040RP016
JK752	A	RCA JACK JPJ8011-01-430 or	JXRL030HD001
	A	RCA JACK MSP-282V-14 or	JXRL030LY001
	A	RCA JACK AV2-8.4-15	JXRL030RP001
JK752	B,C,D,E	RCA JACK JPJ5121-01-324 or	JYRL060HD009
	B,C,D,E	RCA JACK MSP-293V3-324 or	JYRL060LY003
	B,C,D,E	RCA JACK AV3-8,4-15A	JYRL060RP004
JK753		RCA JACK(YELLOW) JPJ2023-01-040 or	JXRL010HD014
		RCA JACK(YELLOW) MSP-281V4-B or	JXRL010LY003
		RCA JACK(YELLOW) AV1-15-3	JXRL010RP013
JK754	B,C,D,E	RCA JACK(WHITE) JPJ2023-01-030 or	JXRL010HD013
	B,C,D,E	RCA JACK(WHITE) MSP-281V1-B or	JXRL010LY005
	B,C,D,E	RCA JACK(WHITE) AV1-15-4	JXRL010RP014
JK755	A	RCA JACK(WHITE) JPJ2023-01-030 or	JXRL010HD013
	A	RCA JACK(WHITE) MSP-281V1-B or	JXRL010LY005
	A	RCA JACK(WHITE) AV1-15-4	JXRL010RP014
JK755	B,C,D,E	RCA JACK(RED) JPJ1023-01-020 or	JYRL010HD006
	B,C,D,E	RCA JACK(RED) MSP-281V3-A or	JYRL010LY002
	B,C,D,E	RCA JACK(RED) AV1-15S-2	JYRL010RP005
RS501		REMOTE RECEIVER NJL65V367S or	USESJRSJR012
		REMOTE RECEIVER NJL65V367B or	USESJRSJR013
		REMOTE RECEIVER PIC-26042LU	USESJRSKK022
SA001 ⚠		SURGE ABSORBER JVR-10N471K or	NVQZR10N471K
⚠		SURGE ABSORBER ENC471D-10AC	QVQZC471D10A
T001 ⚠		SWITCHING TRANS 98081 or	LTT00CPKT029
⚠		PULSE TRANS SA-80918	LTT00CPSA051

Ref. No.	Mark	Description	Part No.
TP301		PCB JUMPER D0.6-P30.0	JW30.0T
TP302		PCB JUMPER D0.6-P27.5	JW27.5T
TP303		PCB JUMPER D0.6-P30.0	JW30.0T
TP501		PCB JUMPER D0.6-P25.0	JW25.0T
TP502		PCB JUMPER D0.6-P7.5	JW7.5T
TP505		PCB JUMPER D0.6-P5.0	JW5.0T
TP506		PCB JUMPER D0.6-P5.0	JW5.0T
TP507		PCB JUMPER D0.6-P5.0	JW5.0T
TP701	B,C,D,E	PCB JUMPER D0.6-P5.0	JW5.0T
TP751		PCB JUMPER D0.6-P12.5	JW12.5T
TP752	B,C,D,E	PCB JUMPER D0.6-P12.5	JW12.5T
TP753	B,C,D,E	PCB JUMPER D0.6-P12.5	JW12.5T
TU701		TUNER UNIT TMDH2-008A or	UTUNNTUAL020
		TUNER UNIT NJH3091U204 or	UTUNNTUJR007
		TUNER UNIT 3AE4F1VD015AP	UTUNNTUSP010
VR501		CARBON P.O.T. 100k Ω B(H) or	VRCB104HH009
		CARBON P.O.T. 100k Ω B	VRCB104KA011
VR701	B,C,D,E	CARBON P.O.T. 50k Ω B(H) or	VRCB503HH011
	B,C,D,E	CARBON P.O.T. 50k Ω B	VRCB503KA010
VR901	B,C,D,E	CARBON P.O.T. 10k Ω B(H) or	VRCB103HH011
	B,C,D,E	CARBON P.O.T. 10k Ω B	VRCB103KA010
VR902	B,C,D,E	CARBON P.O.T. 5k Ω B(H) or	VRCB502HH011
	B,C,D,E	CARBON P.O.T. 5k Ω B	VRCB502KA010
X301		X'TAL 3.579545MHZ or	FXC355LLN001
		X'TAL 3.579545MHZ or	FXC355LNL001
		X'TAL 3.579545MHZ	1811389
X502		X'TAL 32.768KHZ or	FXB323LDS002
		X'TAL 32KHZ(10PPM)	1811351

Function CBA (MCV-B)

Ref. No.	Mark	Description	Part No.
		Function CBA (MCV-B)	————
		CONNECTOR	
CN651		ANGLE SOCKET CONNECTOR, 3P IMSA-9110S-03L	JC91B03ER001
		RESISTORS	
R651		CHIP RES. 1/10W J 1.5k Ω or	RRXAJB6Z0152
		CHIP RES. 1/8W J 1.5k Ω	RRX8JB6Z0152
R652		CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
		CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R653		CHIP RES. 1/10W J 1.2k Ω or	RRXAJB6Z0122
		CHIP RES. 1/8W J 1.2k Ω	RRX8JB6Z0122
R654		CHIP RES. 1/10W J 1.5k Ω or	RRXAJB6Z0152
		CHIP RES. 1/8W J 1.5k Ω	RRX8JB6Z0152
R655		CHIP RES. 1/10W J 2.2k Ω or	RRXAJB6Z0222
		CHIP RES. 1/8W J 2.2k Ω	RRX8JB6Z0222
R656		CHIP RES. 1/10W J 3.3k Ω or	RRXAJB6Z0332
		CHIP RES. 1/8W J 3.3k Ω	RRX8JB6Z0332
R657	A,B,C	CHIP RES. 1/10W J 8.2k Ω or	RRXAJB6Z0822
	A,B,C	CHIP RES. 1/8W J 8.2k Ω	RRX8JB6Z0822
R658	A,B,C	CHIP RES. 1/10W J 3.9k Ω or	RRXAJB6Z0392
	A,B,C	CHIP RES. 1/8W J 3.9k Ω	RRX8JB6Z0392
R659	A,B,C	CHIP RES. 1/10W J 3.3k Ω or	RRXAJB6Z0332
	A,B,C	CHIP RES. 1/8W J 3.3k Ω	RRX8JB6Z0332
		SWITCHES	
SW651	E	TACT SWITCH SKQSAF001A or	SST0101AL041
	E	TACT SWITCH KSM0614B	SST0101HH013
SW652	E	TACT SWITCH SKQSAF001A or	SST0101AL041
	E	TACT SWITCH KSM0614B	SST0101HH013
SW653	E	TACT SWITCH SKQSAF001A or	SST0101AL041
	E	TACT SWITCH KSM0614B	SST0101HH013
SW654		TACT SWITCH SKQSAF001A or	SST0101AL041
		TACT SWITCH KSM0614B	SST0101HH013
SW655	E	TACT SWITCH SKQSAF001A or	SST0101AL041
	E	TACT SWITCH KSM0614B	SST0101HH013
SW656	E	TACT SWITCH SKQSAF001A or	SST0101AL041

Ref. No.	Mark	Description	Part No.
	E	TACT SWITCH KSM0614B	SST0101HH013
SW657	E	TACT SWITCH SKQSAF001A or	SST0101AL041
	E	TACT SWITCH KSM0614B	SST0101HH013
SW658	A,B,C	TACT SWITCH SKQSAF001A or	SST0101AL041
	A,B,C	TACT SWITCH KSM0614B	SST0101HH013
SW659	A,B,C	TACT SWITCH SKQSAF001A or	SST0101AL041
	A,B,C	TACT SWITCH KSM0614B	SST0101HH013
SW660	A,B,C	TACT SWITCH SKQSAF001A or	SST0101AL041
	A,B,C	TACT SWITCH KSM0614B	SST0101HH013
SW667	A,B,C,D	TACT SWITCH SKQSAF001A or	SST0101AL041
	A,B,C,D	TACT SWITCH KSM0614B	SST0101HH013
SW671	A,B,C,D	TACT SWITCH SKQSAF001A or	SST0101AL041
	A,B,C,D	TACT SWITCH KSM0614B	SST0101HH013
SW672	A,B,C,D	TACT SWITCH SKQSAF001A or	SST0101AL041
	A,B,C,D	TACT SWITCH KSM0614B	SST0101HH013
SW673	A,B,C,D	TACT SWITCH SKQSAF001A or	SST0101AL041
	A,B,C,D	TACT SWITCH KSM0614B	SST0101HH013
SW675	A,B,C,D	TACT SWITCH SKQSAF001A or	SST0101AL041
	A,B,C,D	TACT SWITCH KSM0614B	SST0101HH013
SW676	A,B,C,D	TACT SWITCH SKQSAF001A or	SST0101AL041
	A,B,C,D	TACT SWITCH KSM0614B	SST0101HH013

DECK PARTS LIST

Note:

Three different, but interchangeable, types of Capstan Motor (B37) may be installed in these models. Based on the type of capstan motor, items B365 and L1063 will be used/not used as shown in the table below.

Type	Part No.	B365	L1063
A	MMDZB12SJ006	Not used	Not used
B	MMDZB12SJ007	Not used	Not used
C	N9630CML	Used	Used

Comparison chart of Models and Marks

Model No.	Mark
2945LF	A
2965LF	B
2970LV	C
2965LV	D
VR-69WF	E

Ref. No.	Mark	Description	Part No.
2B6		DECK EARTH PLATE U17	0VM408662
2L051		SCREW, S-TIGHT M3X5 BIND HEAD+	GBMS3050
B1		CHASSIS ASSEMBLY MK8	0VSA09370
B2	A	CYLINDER ASSEMBLY(MK8) NTSC 4HD SQPB	N8048CYL
B2	B,C,D,E	CYLINDER ASSEMBLY MK8 NTSC 4HD-HIFI or	0VM202471
	B,C,D,E	CYLINDER ASSEMBLY(MK8) NTSC 4HD HIFI	N8068CYL
B2		CYLINDER ASSEMBLY MK8 NTSC 4HD-HIFI	0VM202471
B3		LOADING MOTOR ASSEMBLY MK7	0VSA08840
B4		MOTOR HOLDER MK8	0VM409330
B8		PULLEY ASSEMBLY MK6	0VSA08132
B9		MOVING GUIDE S PREPARATION MK7	0VSA09220
B10		MOVING GUIDE T PREPARATION MK7	0VSA09221
B11		LOADING ARM T ASSEMBLY MK7	0VSA08858
B12		LOADING ARM S ASSEMBLY MK8	0VSA09410
B13		LOADING LEVER ASSEMBLY MK7	0VSA08821
B15		LUMIRROR WASHER 3.1X6X0.35	0VM403269
B21		LOADING BELT MK6	0VM407712
B27		TENSION LEVER ASSEMBLY MK8	0VSA09374
B31		AC HEAD ASSEMBLY MK7	0VSA08825
B32		REEL(T) MK8	0VM303516
B35		TAPE GUIDE ASSEMBLY MK8	0VSA09359
B37		CAPSTAN MOTOR F2QTB36 or	MMDZB12SJ007
		CAPSTAN MOTOR F2QTB35 or	MMDZB12SJ006
		CAPSTAN MOTOR 288/CCM001	N9630CML
B38		MODE LEVER MK8	0VM202450
B46		TAPE GUIDE ARM SPRING MK6	0VM407704C
B47		ADJUST SCREW M2.6X6(SOD)	0VM409436
B51		FF ARM MK8	0VM303504
B52		CAPSTAN BELT(2) MK6	0VM408223
B53		REEL P.S.W MK8	0VM409410
B73		FE HEAD(MK7) HVFHP0019A or	DHVEC01AL004
		FE HEAD(MK7) MH-131SF7	DHVEC01Z0001
B74		PRISM MK8	0VM303518
B81		M LEVER HOLDER MK7	0VM303171
B86		F BRAKE ASSEMBLY MK7	0VSA08944
B108		P.S.W F	0VM402629A
B121		WORM MK6	0VM407662
B122		P.S.W C	0VM402626
B123		P.S.W (WORM THRUST)	0VM403348
B126		PULLEY MK6	0VM407661
B132		CLUTCH ASSEMBLY MK8	0VSA09379A
B133		IDLER ASSEMBLY MK8	0VSA09377
B142		SHAFT LOCK ASSEMBLY	0VSA04642
B144		CLUTCH WASHER MK2	0VM404428
B145		MAIN LEVER ASSEMBLY MK7	0VSA08822
B148		TG CAP MK6	0VM407664C
B300		FL ASSEMBLY MK8	0VSA09361
B302		RACK MK8	0VM202451
B303		FRONT DOOR OPENER MK7	0VM303185G
B304		DOOR OPENER MK7	0VM303148H
B308		SLIDER SHAFT MK8	0VM409335
B313		DRIVE GEAR SPRING MK7	0VM408557A
B319		CASSETTE SPRING MK8	0VM409333
B329		HOLDER KICK ARM N MK6	0VM302956B
B332		HOLDER ARM SPRING MK6	0VM408062B
B339		REEL(S) MK8	0VM303515
B344		CASSETTE GUIDE R MK8	0VM100786E
B345		CASSETTE GUIDE L MK8	0VM100785E
B347		GUIDE HOLDER(F) MK8	0VM303522
B348		GUIDE HOLDER R MK8	0VM303502
B350		SLIDER GEAR MK8	0VM409329
B352		CASSETTE DRIVE GEAR(N) MK6	0VM302969A
B353		CASSETTE PLATE SUB ASSEMBLY MK8	0VSA09368
B354		SLIDER(R) MK8	0VM202454
B355		SLIDER(L) MK8	0VM202453
B358		CAM MK7	0VM100724
B359		CLEANER LEVER MK7 (See Mechanical Parts List)	
B360		CLEAN ROLLER MK4 (See Mechanical Parts List)	
B361		CLEAN BEARING MK4 (See Mechanical Parts List)	
B365		RADIATOR PLATE MK7	0VM408563
B401	A	VH CONNECTOR 6A MK7	0VM303175
B401	B,C,D,E	VH CONNECTOR 9A MK7	0VM303176
B402	A	VH CONNECTOR 6B MK6	0VM407722
B402	B,C,D,E	ACH-9B MK6	0VM407672
B403		ACH CONNECTOR A MK7	0VM303177J
B404		ACH CONNECTOR B MK7	0VM408582
B405		P.S.W CUT 1.6X4.0X0.5T	0VM408485A
B406		SENSOR GEAR MK7	0VM408575
B407		M GEAR MK6	0VM407666A
B409		EJECT SPRING MK7	0VM408716
B410		PINCH ROLLER ASSEMBLY MK7	0VSA08809
B411		PINCH SPRING MK7 or	0VM408550
		PINCH SPRING MK8	0VM409340B
B412		S BRAKE LEVER MK7	0VM303150
B413		M BRAKE T SUB ASSEMBLY MK7	0VSA09222
B414		M BRAKE S ASSEMBLY MK7	0VSA08814
B415		S BRAKE L SPRING MK7	0VM408556
B416		M BRAKE T SPRING MK7	0VM408588
B417		TENSION SPRING MK8	0VM409452
B418		TENSION PLATE MK8	0VM409451
B419		BT ARM MK7	0VM303182

Ref. No.	Mark	Description	Part No.
B420		REC ARM MK7	0VM303188
B421		REC ARM SPRING MK6	0VM407708D
B423		SHIELD, CYLINDER (See Mechanical Parts List)	
B425		LOCK LEVER SPRING MK7	0VM408555
B426		KICK PULLEY MK6	0VM407663B
B427		KICK SPRING MK6	0VM407701
B428		P.S.W CUT 1.6X4.0X0.5T	0VM408485A
B435		F BRAKE SPRING MK7	0VM408722A
B460		BT SPRING MK7	0VM408551
B461		MAIN LEVER SPRING MK8 or	0VM409494
		MAIN LEVER SPRING MK7	0VM408554E
B462		PRISM(L2) MK8	0VM409371
B463		PRISM(R2) MK7	0VM409176B
B464		CASSETTE DRIVE LEVER SUB ASSEMBLY MK7	0VSA08827A
B465		INSULATION COVER MK8	0VM303517
B468		SOFT SPRING A MK7	0VM409214
B470		TAPE GUIDE ARM ASSEMBLY MK8	0VSA09358
B471		CASSETTE GUIDE R ASSEMBLY MK8	0VSA09363
B472		SLIDER R ASSEMBLY MK8	0VSA09365
B473		SLIDER L ASSEMBLY MK8	0VSA09366
B474		CASSETTE DRIVE LEVER ASSEMBLY MK7	0VSA08813A
B475		BT ARM ASSEMBLY MK7	0VSA08815
B476		REC ARM ASSEMBLY MK7	0VSA08819
B480		CLEANER ASSEMBLY MK7 (See Mechanical Parts List)	
L1051		SCREW, S-TIGHT M2.6X6 PAN HEAD +	GPMS9060
L1053		SCREW PRISM MK7	0VM409038
L1063		SCREW, S-TIGHT M2.6X4 PAN HEAD+	GPMS9040
L1081		SCREW, S-TIGHT M3X6 BIND HEAD+	GBMS3060
L1101		SCREW, P-TIGHT 3X10 BIND HEAD+	GBMP3100
L1114		SCREW, P-TIGHT M2X6 WASHER HEAD+	GCMP2060
L1151		SCREW, SEMS M3X4 PAN HEAD+	CPM33040
L1191		SCREW, P-TIGHT M2.6X12 WASHER HEAD+	GCMP9120
L1321		SCREW, P-TIGHT 3X8 BIND+ CHROME	GBMP3080
L1341		SCREW, P-TIGHT M2.6X8 BIND HEAD+	GBMP9080
L1342		SCREW, P-TIGHT M2.6X6 BIND HEAD+	GBMP9060
L1402		SCREW, P-TIGHT M2X6 WASHER HEAD+	GCMP2060
L1403		SCREW, P-TIGHT M3X10 WASHER HEAD+	GCMP3100
L1406		SCREW, S-TIGHT M2.6X4 CUP HEAD+	GCMS9040
L1407		SCREW, S-TIGHT M2.6X8 PAN HEAD+	GPMS9080
L1450		SCREW, SEMS M2.6X5 PAN HEAD+	CPM39050
L1451		SCREW:SLIDER R MK7	0VM408853

Mode SW CBA (SWV)

Ref. No.	Mark	Description	Part No.
B422		Mode SW CBA (SWV)	0VSA09408
CL281		PARALLEL WIRE 2P AWG26/GREY/UL2651	WX1N8002-001
R281		CARBON RES. 1/4W G 3.6k Ω or	RCX4GATZ0362
		CARBON RES. 1/6W G 3.6k Ω	RCX6GATZ0362
R282		CARBON RES. 1/4W G 1.5k Ω or	RCX4GATZ0152
		CARBON RES. 1/6W G 1.5k Ω	RCX6GATZ0152
R283		CARBON RES. 1/4W G 10k Ω or	RCX4GATZ0103
		CARBON RES. 1/6W G 10k Ω	RCX6GATZ0103
R284		CARBON RES. 1/4W G 22k Ω or	RCX4GATZ0223
		CARBON RES. 1/6W G 22k Ω	RCX6GATZ0223
R285		CARBON RES. 1/4W G 470 Ω or	RCX4GATZ0471
		CARBON RES. 1/6W G 470 Ω	RCX6GATZ0471
SW281		MODE SWITCH HMW0420-910010 or	SSR0104HD004
		MODE SWITCH SSS-27MD	SSR0104KB002

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